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THESIS

**INCORPORATING PRIVATE SECTOR IDEAS INTO
MILITARY RETIREMENT REFORM: A CASH BALANCE
PLAN APPROACH**

by

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June 2014

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RETIREMENT REFORM: A CASH BALANCE PLAN APPROACH**

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ABSTRACT

Since 1948, a number of commissions have attempted to reform the military retirement system. Today's military retirement system, however, still remains largely the same as then. Previous reform proposals attempted to alleviate the four primary criticisms of the retirement system: growing cost, inequity to those with fewer than 20 years of service, hindered force manning, and a lack of civilian comparability.

Hybrid defined benefit plans called cash balance plans are increasing in popularity in the private sector and contain defined contribution aspects. These cash balance plans provide a more conservative approach to retirement by placing more of the risk on the employer.

This thesis presents an alternative approach to retirement system modernization that addresses the four primary criticisms. By incorporating a cash balance system in lieu of a defined contribution component and maintaining an old age annuity, a plan is proposed that still provides comparable retirement income to today's system. The proposed system provides a higher present value than the current system and a system that the Department of Defense proposed in March 2014 for any discount rate above 4.85 percent. The proposed alternative system requires lower outlays than the current system and provides higher undiscounted lifetime earnings than the current system. The alternative system proposed in this thesis offers a viable modernization alternative for military retirement.

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LIST OF ACRONYMS AND ABBREVIATIONS

ACCP	aviation career continuation pay
BBA	Bipartisan Budget Agreement
CBO	Congressional Budget Office
COLA	cost of living adjustment
CPI	consumer price index
CSB	career status bonus
CYXX\$	constant year dollars in 20XX
DACMC	Defense Advisory Commission on Military Compensation (2006)
DB	defined benefit
DBB	Defense Business Board
DCF	Discounted Cash Flow equation
DMC	Defense Manpower Commission (1976)
DOD	Department of Defense
FY	fiscal year
FV	future value
GDP	gross domestic product
Hi-3	service member's average of highest three years of basic pay
HR	human resource
IAC	Interagency Committee on Uniformed Services Retirement and Survivor Benefits (1971)
IRA	individual retirement account
MCRMC	Military Compensation and Retirement Modernization Commission
MRF	Military Retirement Fund
NPV	net present value
OSD	Office of the Secretary of Defense
PCMC	President's Commission on Military Compensation
PV	present value
PSCA	Plan Sponsor Council of America
QRMC	Quadrennial Review of Military Compensation

RMA	Retirement Modernization Act
SRB	selective reenlistment bonus
TSP	Thrift Savings Plan
USRBA	Uniformed Services Retirement Benefits Act of 1979
YOS	years of service

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I. INTRODUCTION

A. BACKGROUND

Current projections show that, absent any change in laws, the United States federal debt will reach 100 percent of gross domestic product (GDP) by 2038 (Congressional Budget Office [CBO], 2013). As part of this figure, the Congressional Budget Office estimates that outlays from the Military Retirement Fund (MRF) will grow from \$51.7 billion in constant year 2012 dollars (CY12\$) to \$59 billion (CY12\$) by 2022 (CBO, 2012). The Defense Business Board (DBB) stated that these increasing retirement costs make the current system “increasingly unaffordable” and will become unsustainable if not changed (Defense Business Board [DBB], 2011, p. 3). These nonpartisan estimates support the need to reduce costs in the federal government. In November 2013, the CBO proposed 103 options to Congress that could reduce budget deficits and slow the growth of the national debt. One of these options entailed reforming federal pensions, both civilian and military (CBO, 2013). Congress attempted to take a step in reform with the Bipartisan Budget Agreement (BBA) passed in December 2013, reducing military retirees’ cost of living adjustment (COLA) for inflation by one percent. Immediate public outcry from veterans groups, however, led to that reduction being repealed in February 2014, only two months later (Klimas, 2014).

This growing cost demonstrates the need to reform military retirement to a more affordable level, but doing it in a method that provides adequate and comparable compensation to the existing military retirement system. To this end, the president of the United States and Congress created the Military Compensation and Retirement Modernization Commission (MCRMC) as part of the National Defense Authorization Act for Fiscal Year 2013. Congress tasked the commission to review military compensation and retirement systems, and then recommend avenues to modernize them. As written in the law, the modernization recommendations, due in May 2014, should preserve the all-volunteer force, provide for the quality of life of service members and their families, and achieve fiscal sustainability (National Defense Authorization Act for Fiscal Year 2013).

In 2011, the Department of Defense (DOD) initiated a two-year review of the current retirement system and provided its recommendations to the MCRMC in March 2014. The DOD proposal outlined significant reforms that it believes best achieve the desired outcome of modernizing the retirement system while adhering to the congressional mandates. Additionally, the DOD proposal answered some of the criticisms of the existing system, most notably that a majority of service members do not receive any retirement compensation (DOD, 2014).

Military retirement modernization continues to be a prominent topic at the highest levels of the federal government and DOD. In line with this trend, this thesis attempts to provide additional information to policy makers so that they may make informed decisions regarding retirement modernization. To achieve this objective, this thesis analyzes current trends and best practices in private-sector retirement compensation to incorporate them into a modern retirement model.

B. RETIREMENT SYSTEM TYPES

Retirement systems include two types of retirement pension plans: defined benefit plans and defined contribution plans. With defined benefit plans, the plan sponsor guarantees a specified benefit based on salary and years of service. Defined benefit plans generally provide a monthly benefit or annuity, but may also be distributed as a lump sum (General Accounting Office, 2002). In 2014, the military retirement system provides a defined monthly annuity and is considered a defined benefit system (Burrelli & Torreon, 2014).

With a defined contribution plan, the plan sponsor and employee periodically contribute to an investment account. This defined contribution account is subject to market returns (positive and negative) and does not provide a guaranteed benefit in retirement (General Accounting Office, 2002).

This thesis proposes a modernization to the military retirement system, and then compares it to the military retirement system and an alternative system proposed by the Department of Defense. As such, these systems will be described as being a defined benefit or defined contribution system.

C. PURPOSE

The objective of this research is to determine and then incorporate the best practices of civilian retirement compensation into a model for military retirement reform. The model attempts to leverage current private sector compensation approaches into a plan that satisfies the objective of bringing military retirement more in line with civilian compensation while still providing significant retirement compensation comparable to the current defined benefit system. Ultimately, this thesis proposes incorporating a cash balance defined benefit component into a modernized military retirement system alternative that balances aspects of civilian compensation with the unique requirements of military retirement.

D. RESEARCH QUESTIONS

The primary research question addressed in this thesis is:

- Does a cash balance component provide a viable alternative for military retirement system reform?

Additional questions investigated include the following:

- What are the current trends and concerns observed in private sector retirement plans?
- How does the alternative model compare to the current DOD proposal?

E. SCOPE AND LIMITATIONS

The current military retirement system provides retirement benefits for active-duty service members, reserve component service members, disabled service members, and some surviving spouses of deceased retirees. While reserve, disability, and eligible survivor retirement benefits are important, they only accounted for approximately \$1.45 billion, \$5.68 billion, and \$3.76 billion, respectively, of the total \$54.09 billion total program cost in fiscal year 2013 (FY2013) (Burrelli & Torreón, 2014). When combined, these three additional retirement entitlements represent only 20 percent of the total program cost. As such, this thesis focuses on active-duty non-disability retirement compensation because it represents a much larger proportion of total program cost.

Additionally, retirees receive nonmonetary benefits in the form of access to military exchanges and commissaries; medical care through TRICARE for Life; and morale, welfare, and recreation facilities (Burrelli & Torreon, 2014). These nonmonetary benefits also fall beyond the scope of this thesis.

This thesis does not provide a manpower-based approach to analyze the effects on retention and force structure. It does utilize observed trends and desires in compensation timing, however, to provide a reasonable alternative model that achieves those goals.

Any change to the military retirement system will incur an additional cost to implement the new system and require appropriation changes via Congress. This thesis does not investigate these necessary changes and their costs.

Finally, this thesis assumes 100 percent grandfathering of current service members in the current system. The proposed alternative would give current members the option to switch to the new alternative, but would not make the switch mandatory.

F. METHODOLOGY

The alternative system proposed in this thesis was compared to the current military retirement system and a DOD-proposed modernization. To achieve comparability, the thesis used the same age and retirement demographics included in the analysis published in the DOD proposal. The contributions and payments for each system were converted into expected annual cash flows from military retirement until age 85. The systems were then compared using present value analysis. Chapter IV provides a detailed description of the proposed alternative system and the calculations performed.

G. ORGANIZATION OF RESEARCH

Chapter II describes the current military retirement system, its origin, and the major criticisms associated with it.

Chapter III reviews major previous reform proposals, the current Department of Defense proposal, and current trends in private sector retirement compensation.

Chapter IV describes the proposed alternative system and the methodology used to compare the alternative system to the current military retirement system and a DOD-proposed modernization to the current system.

Chapter V discusses the results of calculations from the model and compares them to the current system and the DOD proposal. The chapter also presents the sensitivity analysis conducted for this proposal.

Chapter VI offers the conclusions and recommendations based on the analyses in Chapter V.

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II. OVERVIEW OF MILITARY RETIREMENT SYSTEM

This chapter offers a broad summary of the military retirement system. It reviews both 1) the evolution of the current system and 2) the stated objectives and functions of the system's present design. The chapter also describes the three different retirement compensation formulas currently used to calculate benefits and presents some common criticisms levied against them. This information builds the foundation for reforming military retirement in a socially acceptable manner. The Under Secretary of Defense for Personnel and Readiness' *Military Compensation Background Papers* provided the historical information presented in this chapter.

A. HISTORICAL BACKGROUND

The United States' military retirement system began with the Act of February 28, 1855, in which the Secretary of the Navy could remove officers from active duty due to being physically unfit or having questionable morality (Under Secretary of Defense, 2011). In 1861, Congress approved the first formal retirement system for Army, Navy, and Marine Corps officers by establishing voluntary retirement for officers serving over 40 years of service (YOS), and then expanded that to include the involuntary retirement of officers with 45 YOS or after reaching age 62 (Under Secretary of Defense, 2011). The benefits offered under the 1855 and 1861 retirement laws varied slightly by service, but they both established a retirement pay with a monetary value equal to "proper pay" (the only pay rate at the time) plus "four rations" (Under Secretary of Defense, 2011). The rations effectively gave pay increases for longevity of service in addition to the single pay rate (Under Secretary of Defense, 2011).

The Act of February 14, 1885 initiated nondisability retirement for Army and Marine Corps enlisted personnel to bring parity with the officer corps and provide an instrument of force management (Under Secretary of Defense, 2011). This act allowed enlisted personnel to voluntarily retire after 30 YOS and provided a retirement pay of 75 percent of active-duty pay plus an allowance in place of quarters (Under Secretary of Defense, 2011). Congress extended the 30 YOS retirement to Navy enlisted personnel in

1899 and then consolidated the 30 YOS voluntary retirement for all branches' enlisted personnel in 1907 (Under Secretary of Defense, 2011). Prior to 1885, the Army, Navy, and Marine Corps managed their forces through selected acceptance (or non-acceptance) of reenlistment contracts. (Under Secretary of Defense, 2011)

The Act of August 29, 1916 (Under Secretary of Defense, 2011) created two major changes and long-standing effects for the military retirement system. First, the law initiated the "up-or-out selective promotion plan" in which officers who failed to promote by a specified age (associated with their rank) were involuntarily retired (Under Secretary of Defense, 2011). Second, Congress introduced a pay formula to determine retirement benefits. This formula established retirement benefits at 2.5 percent of final monthly basic pay for each year of service up to 30 YOS and not to exceed 75 percent. This formula stood until 1980 (Under Secretary of Defense, 2011).

In 1946, Congress established an enduring aspect of the military retirement system: voluntary retirement for naval officers with 20 YOS. Congress took this action to reduce the number of officer accessions resulting from World War II, essentially creating a force management tool (Under Secretary of Defense, 2011). With the Army and Air Force Vitalization and Retirement Equalization Act of 1948, Congress extended this same benefit to Army and Air Force officers, effectively creating a uniform retirement system for officers of every branch of service (Under Secretary of Defense, 2011). From that point, officers with 20 YOS, 10 of which must be commissioned, could retire with 2.5 percent of their final basic pay for each YOS. During this same period, Congress aligned the enlisted voluntary retirement pay formula with that of the officer ranks. (Under Secretary of Defense, 2011)

In response to rising military retirement costs and future liabilities (Under Secretary of Defense, 2011), Congress, through the Department of Defense Authorization Act of 1981, implemented the first change to the military retirement system since 1948 by altering the formula used to calculate retirement pay (Under Secretary of Defense, 2011). The basic pay component used in the formula switched from the member's final

basic pay to the average of the highest three years of basic pay (Hi-3) (Under Secretary of Defense, 2011). This new formula remains in effect today and will be explained in further detail later in this chapter.

This major reform also created the precedence of grandfathering. As stipulated in the law, any service member who served at the time of enactment fell under the previous final pay formula rather than the Hi-3 formula (Under Secretary of Defense, 2011). Congress adopted grandfathering to prevent negative effects on the retention of critical personnel and to keep faith with members who made career decisions based on the previous system (Under Secretary of Defense, 2011).

B. MILITARY RETIREMENT SYSTEM OBJECTIVES

The DOD Office of the Actuary defines the purpose of the system. Doing so establishes a baseline from which to judge the effectiveness of the system in meeting its ultimate objectives. In the *Valuation of the Military Retirement System—September 30, 2011*, the DOD Office of the Actuary (2013) sets the objective of the military retirement system as,

The principal motivations guiding the nondisability retired pay evolution of the Military Retirement System have been to ensure that (1) continued service in the armed forces is competitive with the alternatives; (2) promotion opportunities are kept open for young and able members; (3) some measure of economic security is made available to members after retirement from a military career; (4) a pool of experienced personnel is available for recall in times of war or national emergency. (p. 50)

The *Military Compensation Background Papers* go further to say that the retirement payments to members must also be “socially acceptable” during old age and “generally competitive with private-sector employers” (Under Secretary of Defense, 2011, p. 571). Thus, any proposed reform must take all of these factors into account, not just singular aspects such as cost reduction.

C. CURRENT IMPLEMENTATION

The nondisability active-duty retirement system provides retirees a lifetime defined benefit. Burrelli and Torreón (2014) explain that the retirement system contains a

20 YOS cliff-vesting point. Therefore, any service member, officer or enlisted, who serves 20 or more years on active duty automatically qualifies, or “vests,” in the retirement plan and becomes eligible for payouts immediately upon retiring. Any member leaving service prior to 20 YOS, however, does not vest in the retirement system. The payouts occur on a monthly basis, equivalent to an annuity. Additionally, the monthly payments are annually inflation-adjusted via a cost-of-living adjustment (COLA) based on the consumer price index (CPI) (Burrelli & Torreon, 2014; Under Secretary of Defense, 2011). Thus, upon retirement, eligible service members receive a monthly, inflation-adjusted payment until their death.

With the early age at which members generally join the military, most military service members retire at a relatively early age after vesting at the 20 YOS point. The average enlisted member retires at age 43 with 22 YOS. The average officer retires at age 45 with almost 24 years of active-duty service (Burrelli & Torreon, 2014).

The current military retirement system offers compensation benefits based on three different formulas for active-duty retirees, commonly known as Final Basic Pay, High Three (Hi-3), and Redux/Career Status Bonus (CSB).

1. Final Basic Pay

The Final Basic Pay formula applies to any service member who entered active-duty service prior to September 8, 1980 (Burrelli & Torreon, 2014). Under this plan, the monthly retirement pay is calculated by multiplying the retiree’s final monthly basic pay by 2.5 percent, referred to as the “multiplier,” and the number of years served. In essence, the service member accrues a retirement benefit after 20 YOS at the rate of an additional 2.5 percent per YOS. Thus, service members retiring at 20 YOS would receive 50 percent of their final monthly basic pay ($2.5\% \times 20 \text{ YOS}$) for the rest of their life (Under Secretary of Defense, 2011). In 2014, those members on active duty who are eligible for the Final Basic Pay system have at least 33 YOS and are rapidly aging out of the system. The DOD expects the few remaining eligible members to retire by 2016 (Burrelli & Torreon, 2014). Consequently, this formula was not considered when analyzing future retirement systems.

2. Hi-3

Through the Department of Defense Authorization Act of 1981, Congress changed the retirement formula to use the average of the highest three years of basic pay instead of the final basic pay. All members entering service after September 8, 1980 are eligible for this plan (Burrelli & Torreon, 2014). This formula uses the same compensation formula as the Final Basic Pay formula with the noted exception. Thus, a member retiring under this plan at 20 YOS would receive 50 percent of the average of his highest three years (Hi-3) of basic pay. For members serving for 30 years, they would receive 75 percent ($2.5\% \times 30 \text{ YOS}$) of the average of their Hi-3.

Congress removed the 30 YOS cap in 2006 to allow members to continuing receiving a 2.5 percent credit per year of service beyond 30. Now, members serving 40 years can receive 100 percent ($2.5\% \times 40 \text{ YOS}$) of their final basic pay or Hi-3, depending upon the formula under which they are eligible (Burrelli & Torreon, 2014). Consequently, any members serving over 40 years can receive greater than 100 percent of their pay (Burrelli & Torreon, 2014; Under Secretary of Defense, 2011).

3. Redux/Career Status Bonus

In the Military Retirement Reform Act of 1986, Congress changed the retirement formula calculations again in response to criticisms that the military retirement system was too generous (Burrelli & Torreon, 2014). This new retirement system came to be known as “Redux.” At the time, any member entering service on or after August 1, 1986 automatically fell under this plan. Redux established a two-tier retirement system, a reduced annuity until a normal retirement age of 62 and then a full annuity after age 62. The first tier mimicked the Hi-3 plan except that the member’s annuity is reduced by one percent per year for each year that total service is below 30 YOS (retirement still vests at 20 YOS); this reduced annuity remains in effect until age 62. For example, a member serving 20 years would receive 40 percent of his or her Hi-3 ($2.5\% \times 20 \text{ YOS} - 1\% \times 10 \text{ YOS}$). A member serving the full 30 years would receive 75 percent of his Hi-3 ($2.5\% \times$

30 YOS – 1% x 0 YOS), the same as the traditional Hi-3 plan. Additionally, the cost-of-living adjustment is set at CPI minus one under Redux (Under Secretary of Defense, 2011).

The second tier begins after age 62. In this tier, the multiplier reverts to the same as the Hi-3 system. Thus, the 40 percent of Hi-3 monthly pay for members with 20 YOS increases to 50 percent of Hi-3 monthly pay in a one-time catch-up adjustment. This is an increase in monthly pay as opposed to a lump-sum payment (Burrelli & Torreon, 2014; Under Secretary of Defense, 2011).

Due to its negative effects on recruitment and retention (Under Secretary of Defense, 2011), Congress changed the mandatory Redux system in 1999, through the National Defense Authorization Act of 2000. The Redux system became an optional choice rather than a mandatory one for military members. Members could revert to the previous Hi-3 system or remain with the Redux system. If a member chose the Redux system, Congress added a Career Status Bonus (CSB) of \$30,000 to be paid at 15 YOS to offset the lower multiplier. The member must serve an additional five years to complete the full 20 YOS (Burrelli & Torreon, 2014; Under Secretary of Defense, 2011).

In its current form, the Redux/CSB system uses the lower multiplier to calculate monthly pay until age 62 and also pays the CSB at 15 YOS. According to Burrelli and Torreon (2014), only 14,605 of the 1,904,310 total military retirees used this system as of September 2009, representing only 0.77 percent of the total retirees. Consequently, the REDUX option was not analyzed in this thesis. Table 1 provides a summary of the three current options used in the military retirement system.

	Final Basic Pay	Hi-3	Redux/CSB
Applies to	Service members entering before September 8, 1980	Service members entering from September 8, 1980 through July 31, 1986 and persons entering after July 31, 1986 but opting not to accept the 15-year Career Status Bonus	Service members entering after July 31, 1986 and accepting a 15-year Career Status Bonus with an additional 5-year service obligation
Basis of Computation	Final rate of monthly basic pay	Average monthly basic pay for the highest 36 months of basic pay	Average monthly basic pay for the highest 36 months of basic pay
Multiplier	2.5% per year of service	2.5% per year of service	2.5% per year of service less 1% for each year of service less than 30 (restored at age 62)
Cost-of-Living Adjustment	Full CPI	Full CPI	CPI less 1% with one-time catch up at age 62, then resumption of CPI less 1%
Additional Benefit			\$30,000 Career Status Bonus payable at the 15-year anniversary with assumption of 5-year obligation to remain on active duty

Table 1. Military Retirement System Options
(from Under Secretary of Defense, 2011, p. 594)

D. CRITICISMS OF CURRENT SYSTEM

Critics of the military retirement system point to four primary concerns when discussing the need to modernize the current system: the system's cost to the government, inequity to those serving less than 20 years, force management inflexibility, and lack of civilian comparability (Henning, 2011).

1. Cost

The military retirement system's cost provides the most obvious argument for reform. The Defense Business Board (DBB) (2011) describes the current retirement system as "increasingly unaffordable" and "unsustainable" with the present rising costs. The OSD Office of the Actuary forecasts the annual retirement payments to reach \$116.9 billion by 2035, up from \$52.2 billion in 2011 (Defense Business Board, 2011). While these figures may not be adjusted for inflation, they still represent a 124 percent increase in less than 25 years. As such, these costs easily draw attention from those seeking reform.

Critics cite two main reasons for the projected rising costs: increasing basic pay and COLA. As shown, base pay provides the basis for calculating monthly retirement payments. Future retirement payments grow proportionally to increases in basic pay. Henning (2011) further describes that from 2002 to 2011, basic pay increased by 36.8 percent, due primarily to offsets for inflation and recruitment during a decade of combat operations. During this same period, the CPI-based COLA increased by 21.7 percent (Henning, 2011).

Additionally, longer life expectancy means service members receive payments for longer periods, which also increases cost (Defense Business Board, 2011). With the current formulas for calculating retirement benefits, these figures directly affect the forecasted increases in retirement liabilities.

2. Equity

Another commonly cited criticism concerns the perceived inequality and unfairness associated with the 20-year vesting requirement of the retirement system.

Henning (2011) explained that those members who serve up to 19 years do not receive any retirement benefit (excluding disability retirement), while those who serve 20 years or more receive the full retirement benefit. Only 17 percent of military members serve for 20 years or more. Consequently, 83 percent of military members, including a majority of those engaging in combat, receive no retirement benefit for their service (Defense Business Board, 2011; Henning, 2011). O'Hanlon (2013) went as far as saying that the military retirement system is too generous for those vesting at 20 years and not generous enough for those leaving military service prior to vesting.

3. Force Management

According to Henning (2011), the primary goal of the military compensation system is “manning the force with the right number of personnel with the right skills and the right seniority” (p. 24). The retirement system lacks the flexibility to offer benefits to those serving less than 20 years and does not provide incentives that vary with “position, skill, or job description” (Henning, 2011, p. 24).

With the inflexible nature of the retirement system, the 20-year cliff vesting point can negatively affect the services' ability to manage their forces. The system's “all or nothing” nature motivates personnel to stay long enough to vest, but then leave shortly thereafter. According to the DBB (2011), retention drops significantly within the first five years of vesting in the plan. DOD Office of the Actuary data show that 76 percent of military members reaching 20 YOS retire between 20 and 25 YOS (Defense Business Board, 2011).

Additionally, service leadership finds it difficult to release members with at least 15 YOS (Defense Business Board, 2011). Hudson and Buchalter (2007) explain this difficulty. The leadership knows the significant cost to the member if involuntarily separated prior to the 20-year vesting. Thus, commanding officers feel compelled to keep personnel who achieve a certain rank or YOS, as if they have an “implicit contract,” to avoid a negative effect on subordinates' morale. The superiors only separate the absolute lowest performers. This creates a force based on surviving until 20 YOS rather than one based on job-determined requirements (Hudson & Buchalter, 2007).

4. Civilian Comparability

The current military-defined benefit retirement plan lacks major aspects of most civilian retirement plans, most notably early vesting, portability, and choice. Henning (2011) explains that the military competes against the civilian sector for personnel. In the civilian sector, most employees vest at a much earlier time, and thus retain some retirement benefit, especially with 401(k)-style defined contribution plans. Subsequently, civilian employees can move their vested retirement plan benefits from employer to employer. Finally, civilians with defined contribution plans can normally choose how their plan manager invests their funds (Department of Defense, 2014; Henning, 2011). Thus, civilian retirement plans offer more options that provide employees flexibility in their careers. This characteristic of civilian retirement plans provides a hurdle for recruiting and retaining the right mix of military members.

E. CHAPTER SUMMARY

The current military retirement system evolved from a force management tool providing junior personnel with upward mobility to a program that provides a socially acceptable livelihood for retirees. The objectives still remain rooted in maintaining opportunities for young and able members, but now also include aspects of providing retirees economic security and comparability to civilian alternatives. Depending on date of entry into military service, service members can fall under one of three different retirement plans: Final Basic Pay, Hi-3, and the optional Redux/CSB. Knowing the background and objectives of the military retirement system provides a context to assess the current system's shortfalls and offers viable modernization alternatives.

III. LITERATURE REVIEW

This literature review offers information on previous and current military retirement reform proposals from various panels and commissions. The review also provides information on current trends in private-sector retirement compensation practices. The information provided in the chapter describes the major aspects of each subject, but does not include an in-depth discourse on them. The intent of this chapter is to create an informed foundation to understand the challenges and requirements of modernizing the military retirement system and to describe the current approaches to private sector retirement.

A. PREVIOUS MAJOR REFORM PROPOSALS

Modern military retirement reform began with the 1948 Advisory Commission on Service Pay, commonly referred to as the Hook Commission (Christian, 2006). Since then, boards and commissions have studied military retirement system reform and modernization. This section looks at selected reform initiatives to understand their approach to altering the system and also to explain the source of DOD's current retirement reform proposal's components. These proposals contain a variety of changes that generally fall within eight categories. Hudson and Buchalter (2007) based these categories on a 1983 GAO report. The categories include:

- Retirement Eligibility, or Years of Service and Age at which Nondisability Retirement Benefits are Payable
- Formula for Retired Pay, or Cost-of-Living Adjustments
- Contributory versus Noncontributory Retirement
- Vesting of Retirement Benefits
- Severance Pay
- Integration with Social Security
- Transitional and Save Pay
- Adjustment Mechanism (p. 14)

These proposals also contain recommendations for involuntary nondisability, disability, and reserve component retirement. These aspects are not investigated in this thesis.

1. 1948 Advisory Commission on Service Pay

The 1948 Advisory Commission on Service Pay, commonly referred to as the Hook Commission, focused on overhauling the entire military compensation system (Christian, 2006). According to Christian, this commission instituted many reforms that endure today, most importantly the pay and allowances system. The commission also recommended reforms for the retirement system. With members being able to retire at approximately 42 years of age, they viewed the system as being too generous. Furthermore, they felt the 20-year vesting time did not provide equity to those members serving less than 20 years. Consequently, commission members proposed that retirement eligibility be set at 30 years of service (YOS) for any age or after 20 YOS if the member reaches age 60 (officers) or 50 (enlisted) prior to exiting military service. To combat the equity issue, the commission also recommended a set of severance payments for individuals involuntarily separated prior to 20 YOS. In addition, the concurrent Joint Army-Navy Pay Board recommended vesting at 10 YOS with the retirement annuity payable at age 62 (Christian, 2006).

The Hook Commission also investigated a potential defined contribution component, but discounted the option for administrative reasons. They felt the cost of administering the retirement fund would outweigh the savings from it. (Christian, 2006)

2. First Quadrennial Review of Military Compensation

In 1969, the First Quadrennial Review of Military Compensation (QRMC) attempted to lower the cost of the military retirement system through two main approaches: establishing a two-tiered system and a contributory component (Christian, 2006). The First QRMC stated most newly-retired military members would transition to a second career before becoming fully retired because of their relatively early average retirement age. Thus, it recommended a two-tier retirement annuity system (Christian, 2006). According to the committee, the retiree would receive a lower annuity during the

first phase, concurrent with the retiree's second career. Christian (2006) described the committee's view that "all that was warranted was a benefit equal to the second-career earnings loss associated with transition to the civilian labor force" (p. 4). Once the retiree fully exited the labor force beginning at age 62, the second phase, or "old age" tier, began and increased the monthly retirement annuity. The proposed plan still vested at 20 YOS with a benefit equal to 24 percent of final basic pay during the second-career annuity. A member serving until 30 YOS would receive 51 percent of final basic pay. The old age phase increased the monthly annuity and varied from 33 percent of final basic pay for 20 YOS to 75 percent for 40 YOS (Christian, 2006).

The First QRMC also proposed including a contributory component to its plan. Christian (2006) wrote that the commission calculated that the current (at that time) noncontributory system artificially reduced service members' pay by 6.5 percent. Thus, the First QRMC proposed a fully vested contributory element for career members that equated to 6.5 percent of annual pay (Christian, 2006).

3. Interagency Committee on Uniformed Services Retirement and Survivor Benefits

In 1971, the Interagency Committee on Uniformed Services Retirement and Survivor Benefits (IAC) convened to reduce the cost of the military retirement system (Christian, 2006). According to Christian, the IAC introduced a new alternative by proposing the military shift the basis of the retirement formula from final basic pay to the average of the highest three years of pay (Hi-3); the proposal was a new aspect of reform. The committee also recommended keeping the two-tier-style reform from the First QRMC, but with different benefit levels and "old age" payments beginning at age 60. To incentivize career continuation beyond 24 YOS, the full annuity multiplier would increase from 2.5 percent (below 24 YOS) to 3.0 percent for members serving between 25 and 30 YOS (Christian, 2006).

To mitigate the equity issue, the IAC also proposed a deferred annuity starting at age 60 for members serving between 10 and 19 YOS. In lieu of the annuity, members could also take an immediate lump-sum payment instead. The deferred annuity would be calculated at the 2.5 percent rate (Christian, 2006).

4. Uniformed Services Retirement Modernization Act of 1974

One of the Uniformed Services Retirement Modernization Act (RMA) of 1974's stated objectives was to reduce the cost of the retirement system, provide equity to those serving less than 20 years, and aid as a force management tool, particularly in retaining members with 8 to 12 YOS. The RMA included a number of the recommendations from IAC, but it was never enacted into law (Christian, 2006).

Christian (2006) explains the RMA's three primary reform components. First, this legislation proposed using the average highest annual basic pay in the year prior to retiring ("high one") as the basis for the benefits formula. Second, the RMA kept the two-tiered approach, but offered a flat 15 percent reduction for the second-career annuity from the time of retirement until that member would have reached 30 YOS, when the full annuity would be restored. Thus, a member retiring at 20 YOS would receive a 35 percent annuity for the ten years immediately following retirement and then receive the full 50 percent after ten years in retirement. Third, the RMA integrated Social Security with military retirement benefits. Instead of being additive as they were, the RMA offset military retirement benefits by "50 percent of the amount of the Social Security benefit attributable to military service" (Christian, 2006, p. 5).

The RMA kept the 20-year vesting, but also included the 10 to 20 YOS deferred benefit annuity recommended by the IAC to provide some equity to those service members. It did not include the lump-sum payment option, however (Christian, 2006).

5. Defense Manpower Commission

In 1976, the Defense Manpower Commission (DMC) attempted to solve three familiar inadequacies attributed to the military retirement system: cost, equity, and force management (Hudson & Buchalter, 2007). According to Hudson and Buchalter (2007),

the commission also proposed recognizing the innate differences between combat operations and occupations involving administrative-type work. As such, the DMC proposed a shift in the benefit calculation to a points-based system. Members in a combat role earn 1.5 points per year while those in noncombat roles earn 1 point per year. The DMC defined retirement as achieving 30 points, which equated to serving between 20 and 30 years. The retirement annuity, based on the Hi-3 formula, began at 30 YOS. The proposal also included a two-tier system, one for those earning between 10 and 30 points and another for those earning the full 30 points. The first tier, service members with 10 to 20 YOS, created a deferred annuity, receivable at age 65, based on a formula of 2.66 percent of Hi-3 multiplied by the number of accrued points. The second tier, for 20 to 30 YOS, used the same calculation, but with benefits available at 30 YOS or at an earlier date for an actuarially-reduced annuity. Changes to the military retirement system did not result from the DMC report (Christian, 2006; Hudson & Buchalter, 2007).

6. President's Commission on Military Compensation

The President's Commission on Military Compensation (PCMC) convened in 1978 to review the aforementioned retirement studies as well as findings from the DOD Retirement Study Group and a General Accounting Office report on military retirement (Hudson & Buchalter, 2007). According to Hudson and Buchalter (2007), the PCMC focused on three primary criticisms of the military retirement system: inequity to members serving less than 20 years, inflexible force management, and ineffectiveness to retain members after their first enlistment while simultaneously encouraging senior personnel to stay through 20 YOS. The commission's recommendations called for a noncontributory retirement plan that included establishing a deferred compensation trust fund and a single-tier, old age annuity with partial integration of Social Security benefits (Hudson & Buchalter, 2007).

The PCMC recommended a vesting point for an old age annuity at 10 YOS to provide equity to members not reaching 20 YOS. According to Hudson and Buchalter (2007), the commission viewed the old age annuity as a force management tool that competed well with civilian counterparts and provided incentives to continue through 35

YOS. The PCMC calculated that the proposed retirement plan's effects on personnel would be to increase members with less than 10 YOS, decrease those with 10 to 20 YOS, and increase members with 21 or more YOS (Hudson & Buchalter, 2007). Tables 2 and 3 summarize the recommended old age annuity eligibility and multiplier YOS gates.

Years of Active Service Completed	Age at Which Annuity Begins
10-19	62
20-29	60
30 or more	55

Table 2. PCMC Eligibility for Retirement Annuity
(from Hudson & Buchalter, 2007, p. 35)

Years of Service	Per-Year Multipliers (percentage)
1 to 5	2.00
6 to 11	2.25
11 to 35	2.75

Table 3. PCMC Annuity Multipliers
(from Hudson & Buchalter, 2007, p. 35)

In addition to the old age annuity, Christian (2006) wrote that the PCMC recommendation also called for establishing a deferred compensation trust fund for every member with at least 5 YOS. The government would contribute to the fund at varying rates depending on YOS, and the member would vest in their fund after 10 YOS. After vesting, the separating member would have the option to withdraw the fund balance via a lump-sum payment or rollover the balance into another retirement account. The deferred compensation fund encouraged retention in the mid-tenure range by offering higher contribution rates than at earlier years of service. This deferred compensation allowed some form of financial aid while transitioning to civilian life (Christian, 2006). Hudson and Buchalter's (2007) report entitled *A Summary of Major Military Retirement Reform Proposals: 1976–2006* provides a more in-depth analysis of the PCMC recommendations.

The DOD took the PCMC recommendations and modified them to create the Uniformed Services Retirement Benefits Act (USRBA) of 1979 (Christian, 2006). According to Christian (2006), the USRBA eliminated the deferred compensation fund, but allowed service members to borrow against their expected annuities, up to a maximum value of 22 months of basic pay. This provided the optional transition pay option instead of the deferred compensation fund. Congress did not pass the USRBA, however, when the Treasury Department objected to the large near-term outlays expected from including a deferred compensation component (Christian, 2006).

7. Fifth Quadrennial Review of Military Compensation

The Fifth QRMC, in 1982, focused its reform efforts on force management in a cost-reduction environment. As Hudson and Buchalter (2007) state, “the Fifth QRMC regarded force impact considerations, not cost avoidances alone, as foremost in evaluating retirement-system alternatives” (p. 48). Instead of recommending a single retirement plan, the Fifth QRMC offered four alternatives. The vesting period stayed at 20 YOS because the commission stated that the current severance and enlisted bonus pay structure offered elements of equity. Each alternative included an early withdrawal component after reaching retirement eligibility (20 YOS) that equated to a low-rate, interest-only loan (Hudson & Buchalter, 2007). In addition to the early withdrawal component, the Fifth QRMC proposed four separate alternatives:

- A reduced multiplier of 1.75 percent
- Reducing the COLA to 50 percent of CPI until age 62
- A reduced early (pre-30 YOS) benefit rising from 35 percent of Hi-3 (20 YOS) to 75 percent of Hi-3 (30 YOS)
- A combination of 75 percent of COLA until age 62 and the proposed reduced early (pre-30 YOS) benefit (Hudson & Buchalter, 2007)

The recommendation also discounted a contributory retirement system. The Fifth QRMC’s analysis showed that a contributory plan would cause a decline in enlisted career force strengths (Christian, 2006).

8. Defense Advisory Commission on Military Compensation

The Defense Advisory Commission on Military Compensation (DACMC) offered a holistic review of the military retirement compensation structure in 2006 that provided methods to improve the recruitment and retention of a “high-quality, cost-effective, ready military force” (Hudson & Buchalter, 2007, p. 60). In line with the previous reform proposals, the DACMC stated that the current retirement system was “inequitable, inefficient, and inflexible” due to the 20-year vesting, overly-deferred compensation, and force management restriction (Hudson & Buchalter, 2007, p. 61). While not offering a specific retirement plan alternative, the DACMC generated a number of approaches to counteract these deficiencies. The DACMC findings proposed an old age annuity beginning at age 60, an early-vesting defined contribution account, and “offsetting compensation” through various cash payments at specific YOS points (Hudson & Buchalter, 2007).

According to Hudson and Buchalter (2007), the findings described a military force management culture that felt any member who reaches 10 to 12 YOS should be allowed the opportunity to retire because it is unfair not to do so. As evidence, the report noted that the second most frequent departure time from the military occurs at the 20 YOS point, with the most frequent occurring after the initial four-year commitment. The DACMC also specified that the 20-vesting point incentivized members to only stay until 20 YOS, even though the services’ best interest may be served by certain members continuing to serve (Hudson & Buchalter, 2007).

The DACMC also concluded that the current system defers too much compensation via the immediate lifetime annuity (Hudson & Buchalter, 2007). Hudson and Buchalter (2007) explained that the commission sought to increase current compensation in lieu of the deferred compensation. The report argued that this switch offered two distinct benefits. First, the current compensation generated a lower cost to the government. The supporting calculations used an \$87,500 lump-sum bonus paid to an enlisted member at 12 YOS, contingent on the member serving 20 years. Assuming the member had a 10 percent personal discount rate, the lump-sum provided the same financial incentive as the deferred annuity, but cost the government less than half that of

the annuity (Hudson & Buchalter, 2007). Second, the lump-sum satisfied members' desires because individuals generally value current compensation more than deferred compensation. The report also noted that increasing retention through deferred compensation is normally more costly than using current compensation (Hudson & Buchalter, 2007). Table 4 summarizes the DACMC's proposed architecture changes.

	Old Age Annuity	Defined Contribution	Career Continuation Pay	Transition Pay
Vesting	10 YOS	5 - 10 YOS	Based on YOS milestone	10 YOS
Formula	Hi-3 with extension to 40 YOS	Approximately 5% of basic pay	Multiple of basic pay	Based on paygrade and YOS
Comment	Begins at age 60	Government contributions begin upon entrance to active duty	Key YOS milestones: 10, 15, 20, 25, 30 YOS	Limited duration

Table 4. DACMC Proposed Retirement Architecture
(after Hudson & Buchalter, 2007)

9. Defense Business Board

Secretary of Defense Robert Gates gave the Defense Business Board (DBB) a mandate in 2010 to identify options that would significantly reduce overhead and increase efficiency within the DOD's business operations (DBB, 2011). As part of this mandate, the DBB (2011) investigated the military retirement system to develop potential retirement alternatives that would be fiscally sustainable, while at the same time recruiting and retaining the highest-performing members. The DBB focused on inequity to non-vested members, inflexibility in force shaping, and cost savings. In 2011, the DBB recommended discarding the current defined benefit plan and switching to a purely defined contribution plan, commonly seen in the private sector (DBB, 2011).

The DBB (2011) provided the historical context for the current military retirement system and its recommendations in its report. As previously shown, the current system has not been altered to reflect the switch to the All-Volunteer Force. The DBB's findings stated that "the system was designed in an era when life spans were shorter, draft era pay was substantially less than civilian sector pay, second careers were less common, and

skills acquired during military service were not transferrable to the private sector” (DBB, 2011, p. 2). The board also noted that the current military pay is now higher than the average pay for civilians with the same level of education. Both officer and enlisted pay ranked in the top quartile for college and high school graduates, respectively. Lastly, the DBB found that military retirement contributions amounted to approximately 10 times that of the private sector, with military contributions equating to 75 percent of annual pay as compared to a private sector pension with 4 to 12 percent annual contributions (DBB, 2011).

The DBB (2011) recommended switching to a defined contribution system that could easily use the existing federal defined contribution system, the Thrift Savings Plan (TSP), as a model from which to create the new plan. Like private sector plans, the payouts would begin between 60 and 65 years of age. While not specifically setting contribution amounts, the DBB’s (2011) recommended plan suggested various possible contribution rates that could be used to help shape the military force. For example, the military could increase the contribution in direct proportion to the member’s length of service or provide an increase at a specific retention gate. Additionally, the member could receive a higher contribution while deployed in a combat area or separated from family. By having an individual account that vested after a short period, the member could move it to the private sector at the end of service and then back if returning to military service. The DBB also recommended a transition payment, similar to private sector severance pay, which would offer some security for the member while establishing a second career (DBB, 2011).

B. DEPARTMENT OF DEFENSE PROPOSAL

The previous section described a number of major reform initiatives that failed to create major change in the retirement system. The most significant change occurred with the Redux plan described in Chapter II. While that plan still exists, Congress essentially pushed it aside and reverted to the previous Hi-3 system (Under Secretary of Defense, 2011). In its effort to present a plan that meets all objectives, the DOD conducted a two-year study, beginning in 2011. The DOD offered its final proposal to the Military

Compensation and Retirement Modernization Commission (MCRMC) in March of 2014 (DOD, 2014). Like some previous proposals, this proposal provided reform options instead of a specific recommendation. This section focuses on the final DOD recommendations.

1. Background

The DOD study stated that “a more modern and efficient military retirement system may be devised that sustains the All-Volunteer Force, achieves savings, and provides beneficiaries with a lifetime retirement income comparable to today’s” (DOD, 2014, p. 1). To achieve that outcome, the DOD established eight principles to guide the recommendation. These principles include:

- Maintain force profile, recruiting and retention (including the ability to accommodate different future force profiles or recruiting and retention needs)
- Balance interests of force managers, service members and the American taxpayers
- Consider criticisms others have made of the current system
- Carefully consider impacts on the service member and his or her family
- Base any review/examination on rigorous analysis
- Achieve savings
- Improve total force management
- Keep faith with serving members (fully “grandfather” currently serving members and current retirees/survivors) (Department of Defense, 2014, p. 1)

Additionally, the DOD (2014) stated the objectives of the proposed system: to simultaneously offer service members a strong retirement; to give force managers means to shape and maintain the force structure; and to provide a capable and cost-effective force (DOD, 2014).

The DOD (2014) reviewed previous retirement reform proposals to assess the potential effectiveness of their components. The findings indicated that a full defined contribution plan, similar to the Defense Business Board proposal, would devastate

retention and place all retirement risk on the service member. The large increase in current income required to overcome this effect on retention made this plan unfeasible with regard to the objective of providing a cost-effective force. Next, the DOD discounted a reduction in COLA, citing the unacceptably high long-term impact on the financial well-being of a future retiree. Third, a lump-sum payment based on the present value of the current defined benefit plan was deemed too risky to the retiree, and the large size would be heavily scrutinized. Finally, the DOD disregarded a simple reduction in the multiplier as well as changing the basis of the benefit formula from Hi-3 to the average of the highest four or five years. These changes did not modernize the retirement system, only reduced its cost (DOD, 2014).

2. Proposed Modernization

To satisfy all of the intended objectives, the DOD (2014) recommended switching to a hybrid retirement plan that incorporates aspects of both defined contribution and defined benefit plans. As such, the DOD offered two separate, but similar, concepts to the MCRMC. Both concepts include a retirement annuity, defined contribution plan, career continuation pay, and a transition pay to help shift to a second career. The main difference with the two concepts lies with the retirement annuity, with one concept being a two-tier annuity and the second concept being a single-tier annuity. From here on, the two-tier annuity plan will be referred to as “Concept 1” and the single-tier annuity plan will be referred to as “Concept 2” (DOD, 2014).

a. Defined Benefit

Both proposed concepts retain the 20-year vesting point to qualify for the retirement annuity. Similar to the current system, the benefit formulas for both Concept 1 and Concept 2 use Hi-3, a percentage multiplier factor, and YOS. Yet, both concepts reduce the overall annuity for the retiree. The plans intend for the defined contribution and other pay components to compensate for this lost annuity. Consequently, the DOD plans to shift deferred compensation to current compensation, in line with most individuals’ desires (DOD, 2014).

Concept 1 calls for the two-tier annuity plan that recognizes “the propensity for most military retirees to embark upon a second career or continued employment after military retirement” (DOD, 2014, p. 10). According to the DOD (2014), the two-tier system switches from the first tier to the second tier at age 65, approximately the age at which a retiree exits the labor force. The DOD determined that the most effective basis for the first tier would be the member’s full retirement multiplier. Thus, the first tier would use the 2.5 percent factor in the formula, but would cap the first tier at 25 percent of Hi-3. Through modeling and analysis, the DOD review found that this cap achieved the desired retention for the services. For an additional cost-saving alternative, the DOD also offered using a 2.0 percent multiplier factor. This factor capped the first tier at 16 percent of Hi-3 (DOD, 2014).

According to the DOD (2014), Concept 2 utilizes a single-tier plan, as in the current system, that begins annuity payments immediately upon retirement. The main difference from Concept 1 lies with a reduced percentage factor, thus reducing the lifetime annuity benefit. The DOD used 2.0 and 1.75 percent for the multiplier factor in its analysis (DOD, 2014).

b. Defined Contribution

Both Concept 1 and Concept 2 contain the same defined contribution component, specifically the TSP. The DOD (2014) wrote that each concept would automatically make mandatory contributions on behalf of the member, beginning after 2 YOS. An individual member would not need to make any contribution to receive DOD’s contributions. The DOD set the contribution rate at five percent of basic pay (DOD, 2014).

The DOD (2014) set the vesting point at six years and one day of service. Vesting at this time encourages service members to remain on active duty after completing their initial service obligation. Additionally, members serving between 6 and 20 years would now receive some benefit, instead of nothing under the current system. The DOD stated that this could aid in recruiting by making military service more attractive to those not

expecting to serve a full 20 years. Finally, the automatic contributions would end after the member completed 20 YOS because they would not be needed to maintain the desired force (DOD, 2014).

c. Transition Pay

The transition pay component amounts to a lump sum payment at the end of a service member's career. The DOD (2014) stated that this aspect of the recommendation caters to the individual member's preference for current compensation versus deferred compensation and increases the perceived value to the retiring member. Only those members serving at least 20 years would qualify for the transition payment. For funding reasons, the transition pay amount, a multiple of final annual basic pay, would be constant across all services for both enlisted and officers. Under Concept 1 and its lower second-career annuity, the DOD proposed a transition pay of 2.5 times the annual Hi-3 basic pay, in essence two and a half years' worth of basic pay. Concept 2, with its higher immediate annuity, contains a transition pay of 0.5 times the annual Hi-3 basic pay (DOD, 2014).

d. Continuation Pay

The DOD (2014) also recommended a mid-to-late career continuation pay, similar to career incentive bonuses currently employed. This component allows the DOD to target specific communities, specialties, or YOS cohorts that it designated for desired retention. Due to the varying nature of these needs, the proposal would allow the individual services to dictate the varying outlays required to meet force needs. Under Concept 1, the DOD suggested using a range of 0 to 2 months of basic pay for enlisted personnel and 5 to 8 months of basic pay for officers. Similarly, Concept 2 would use 0 to 1 month of basic pay for enlisted personnel and 7 to 11 months of basic pay for officers. The DOD modeled the force-wide effect of these by assuming the enlisted pay would occur at 12 YOS for enlisted and 16 YOS for officers (DOD, 2014). Figure 1 depicts the timeline for the annuities, transition payment, and continuation payment under Concept 1 as it compares to the current system. Table 5 lists the DOD assumptions used to evaluate the retirement concepts.

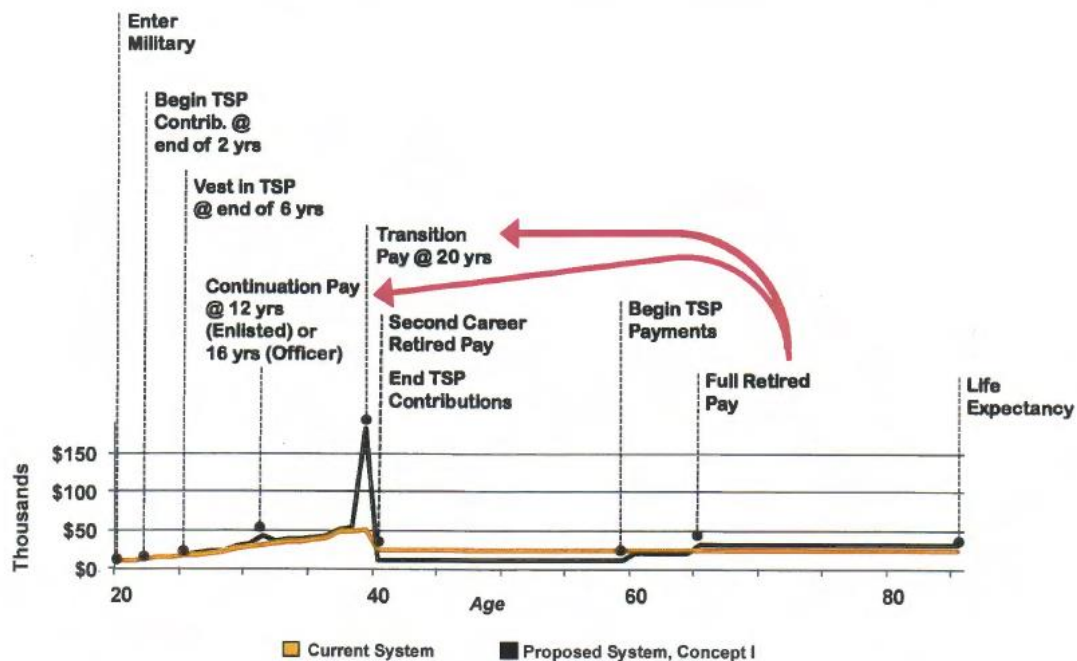


Figure 1. Notional Timeline of Retired Pays, Concept 1 versus Current System (from Department of Defense, 2014, p. 12)

Element	Current		CONCEPT 1				CONCEPT 2			
	Active	Reserve	2.5% Multiplier		2.0% Multiplier		2.0% Multiplier		1.75% Multiplier	
Defined benefit multiplier	2.5%	2.5%	2.5%	2.5%	2.0%	2.0%	2.0%	2.0%	1.75%	1.75%
Defined benefit before full retirement age	Full	None	Capped @ 25% of High-3 until age 65	Capped @ 25% of High-3 until age 65	Capped @ 16% of High-3 until age 62	Capped @ 16% of High-3 until age 62	Full	None until age 60	Full	None until age 60
Defined benefit during full retirement age	Full	Full at age 60	Full at age 65	Full at age 65	Full at age 62	Full at age 62	Full	Full – age 60	Full	Full – age 60
TSP percentage/years of service	NA	NA	5% / 3-20	5% / 3-20	5% / 3-20	5% / 3-20	5% / 3-20	5% / 3-20	5% / 3-20	5% / 3-20
Vesting, defined benefit (years of service)	20	20	20	20	20	20	20	20	20	20
Vesting, defined contribution (years of service)	NA	NA	6	6	6	6	6	6	6	6
Retention bonus multiplier (months of basic pay)(fixed)	NA	NA	E=0-2 O=5-8	E=0-1 O=0-1	E=0-2 O=7-16	E=0-1 O=3-6 (Air Force Rated O=15)	E=0-1 O=7-11	E=0-1 O=0-3	E=1-3 O=14-19	E=0-1 O=0-6
Transition payment multiplier (years high-3 basic pay)(fixed)	NA	NA	2.5	NA	3.0	NA	0.5	NA	0.75	NA
Lifetime retired income (E-7/O-5)*	\$1.1M \$2.1M	\$520K \$910K	\$1.2M \$2.3M	\$580K \$1.1M	\$1.0M \$2.0M	\$480K \$940K	\$1.1M \$2.1M	\$430K \$830K	\$1.0M \$1.9M	\$390K \$750K

Table 5. DOD Assumptions Used for Evaluating Retirement Concepts (from Department of Defense, 2014, p. 17)

3. Assessment

The DOD (2014) evaluated the two proposed concepts in terms of retention of the force structure, cost to the services and DOD, payments to the service member, and the effect on Treasury outlays. In doing so, the DOD completed analyses for each service, to include both officers and enlisted personnel. Reserve component assessments were also made but are not included in this thesis (DOD, 2014).

The DOD (2014) modeling found that the two concepts would closely preserve the current force structure with regard to size and experience. The results showed some differences in estimated retention trends. Additionally, the cost estimates indicated that the military would save between \$0.5 and \$2.7 billion per year, depending on the specific parameters chosen for the analysis. These savings would occur once all members transitioned to the new system. Treasury outlays, however, would increase rapidly after implementation because of the immediate contributions to TSP. The total outlays decline once members falling under the previous plan age out of the system (DOD, 2014).

The DOD (2014) model showed that the overall lifetime earnings for members would increase slightly with the new system. The model used a lifespan of 85 years, a five percent TSP account rate of return until age 65, and a four percent TSP rate of return after 65 (DOD, 2014). Table 6 compares an O-5 and E-7's retirement compensation under Concept 1 to the compensation received under the current system.

Annual Payments			
Grade	Current	2.5%	Difference
E7/20 Second career (pre-65)	\$24,643	\$20,209*	(\$4,435)
E7/20 Old age (65+)	24,643	33,742**	\$9,099
O5/20 Second career (pre-65)	46,748	38,066*	(\$8,682)
O5/20 Old age (65+)	46,748	65,142**	\$18,394
Lifetime Income			
E7/20	\$1,133,578	\$1,213,795	\$ 80,217
O5/20	2,150,408	2,319,632	169,224

* Defined benefit plus transition pay
** Defined benefit plus TSP
NOTE: Transition pay is annuitized over the second-career period at a 4% rate. TSP is assumed to grow at a 5% annual rate and is annuitized over the old-age period at a 4% rate.

Table 6. Compensation under Concept 1 with 2.5% Multiplier
(from Department of Defense, 2014, p. 29)

C. CURRENT TRENDS IN PRIVATE SECTOR RETIREMENT COMPENSATION

Private sector retirement plans continually evolve as employment categories shift and the supporting financial environment fluctuates (Costo, 2006). As such, the private sector contributes innovative ideas and new approaches to retirement reform and modernization. This section offers current trends and practices in private sector retirement compensation. While private sector employment differs from military service, private sector retirement ideas and concepts may be applied to the military retirement system, much like the inclusion of military members into the 401(k)-like Thrift Savings Plan. The research provided in this section comes primarily from human resource (HR) professional organizations, HR consultants, and government labor organizations.

1. Background

Over the last two decades, private sector retirement plans significantly shifted from defined benefit to defined contribution plans (Poterba, Venti, & Wise, 2007). Based

on data from the Bureau of Labor Statistics (Costo, 2006), 32 percent of private industry workers participated in a defined contribution retirement plan from 1992 to 1993, compared to 35 percent participating in a defined benefit retirement plan. By 2005, that ratio shifted to 42 percent participation in a defined contribution plan compared to 21 percent participation in a defined benefit plan (Costo, 2006). By 2013, the trend toward defined contribution participation continued with 42 percent of private industry workers participating in a defined contribution plan and only 16 percent participating in a defined benefit plan (Bureau of Labor Statistics, 2013). Figure 2, based on Department of Labor Form 5500 filings, confirms this trend by depicting the total number of participants in defined contribution and defined benefit plans from 1975 to 2011 (Employee Benefits Security Administration, 2013).

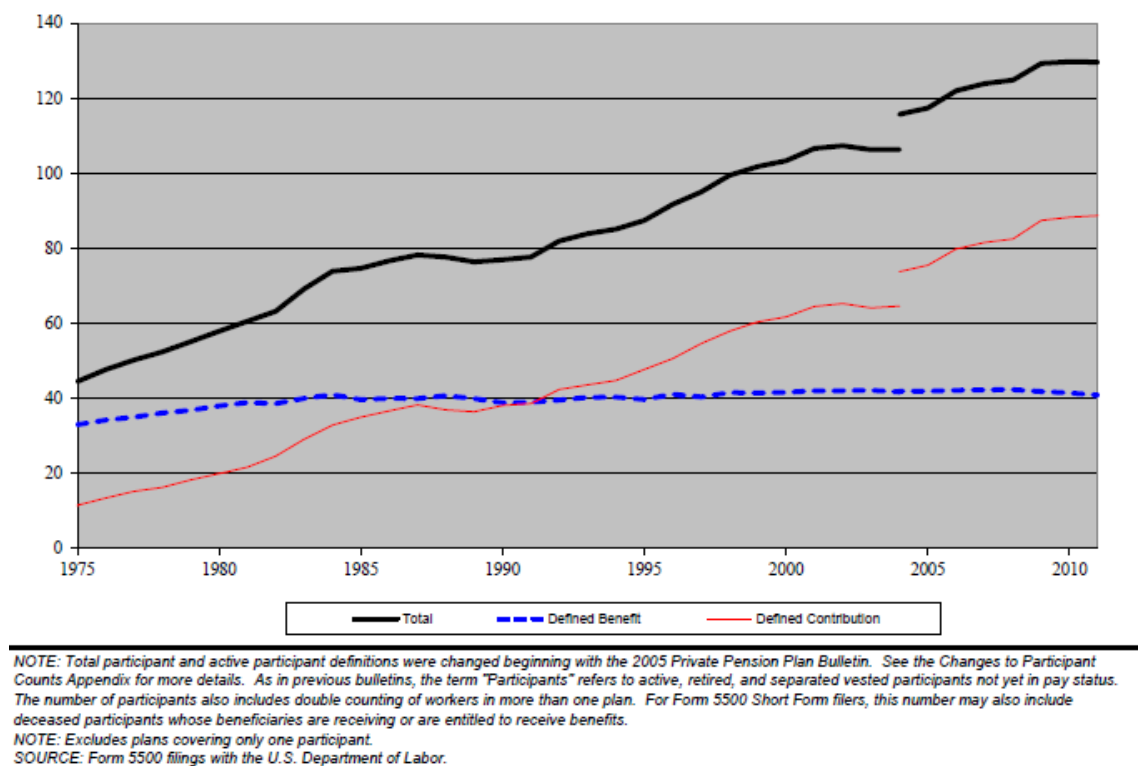


Figure 2. Number of Participants in Pension Plans by Type of Plan, 1975–2011 (numbers in millions)
(from Employee Benefits Security Administration, 2013, p. 6)

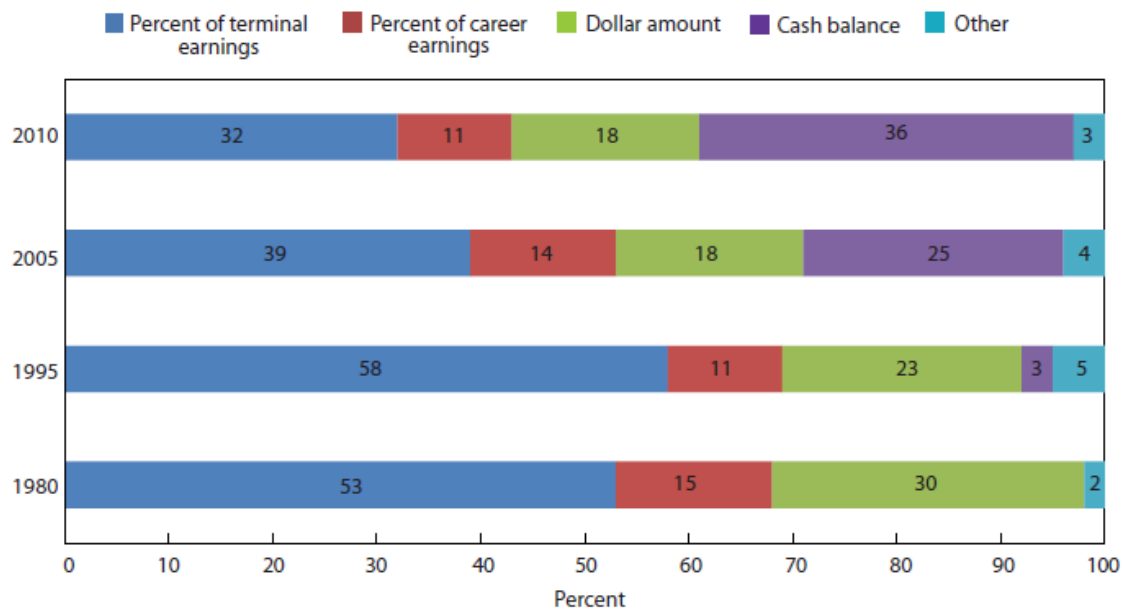
Costo (2006) attributes this shift to two primary reasons: employment changes and defined benefit funding requirements. First, the labor force grew to include more service-oriented occupations while the typical defined benefit-offering industries remained steady or decreased. Additionally, union membership declined over the last decade, also contributing to the shift. Second, increasing liabilities attributed partly to changes in the discount rate applied to defined benefit funding caused unacceptably high contributions and unpredictable cash-flow requirements (Costo, 2006).

2. Defined Benefit

As Costo (2006) noted previously, the primary trend continues to be reductions in defined benefit plans offered by plan sponsors. Within the remaining defined benefit plans, however, plan sponsors continue to offer different types of defined benefits. The shift from traditional defined benefit plans to nontraditional defined benefit plans represents the most distinct observed trend (Costo, 2006).

Traditional defined benefit plans calculate the retirement annuity based on a formula, similar to the military retirement system. The most common formula seen in the private sector uses an average of the final years' earnings to calculate retirement benefits, much the same as the military system (Costo, 2006).

Nontraditional plans offer different methods to calculate retirement benefits. Nontraditional plans are characterized as hybrid plans because they incorporate elements of defined contribution plans into a defined benefit plan (Costo, 2006). Similar to a defined contribution plan, these hybrid plans typically provide the notional value of a participant's retirement account as a means of expressing its current value (Wiatrowski, 2012). In 1980, virtually all defined benefit plans fell into the traditional category, but by 2010, less than two-thirds of plans were considered traditional plans (Wiatrowski, 2012). Wiatrowski (2012) shows traditional defined benefit plans ("percent of terminal earnings," "percent of career earnings," and "dollar amount") decline in favor of nontraditional plans ("cash balance") in Figure 3.



SOURCE: U.S. Bureau of Labor Statistics.

Figure 3. Percentage of Defined Benefit Pension Plan Participants, by Formula and Private Industry, for Selected Years During 1980–2010
(from Wiatrowski, 2012, p. 13)

a. Cash Balance Plan

The most common hybrid defined benefit plan is the cash balance plan. A cash balance plan contains similarities to defined contribution plans in that employers make regular contributions to an account that accumulates value over time (Costo, 2006) and defines the benefit in terms of a stated account balance (Employee Benefits Security Administration, 2014). As a defined benefit plan, the plan sponsor still bears the responsibility for investing the plan assets (Rao, Higgins, & Taylor, 2002). The employer communicates the employee's benefit as this account balance value, but no actual individual account exists because the funds are part of the larger combined pension trust (Johnson, Hatem & Scott, 2011; Wells Fargo, 2012). The Employee Benefits Security Administration (2014) describes these accounts "as 'hypothetical accounts' because they do not reflect actual contributions to an individual account or actual gains and losses

allocable to the account” (p. 1). Essentially, the employer contributes an amount on behalf of the employee to the pension trust and then gives the notional value of the accrued benefit to the employee.

According to the Employee Benefits Security Administration (2014), employers credit a participant’s notional account each year with a pay credit equal to a percentage of annual compensation and an interest credit based on an index such as the 30-year Treasury bill rate. The plan guarantees the value of these credits regardless of fluctuations in the value of the plan’s investments. As such, the employer bears the investment risk (Employee Benefits Security Administration, 2014).

For employers, cash balance plans can be beneficial because employers can keep any excess returns generated by the pension fund assets (Rao et al., 2002). In a thriving market, this can be a very appealing feature. The employer, however, faces higher costs in down markets to cover liabilities from asset losses (Rao et al., 2002).

Upon vesting in the plan, the employee receives the account balance at retirement or employment termination. The departing employee can annuitize the account value for retirement or roll the lump sum value of the account into an individual retirement account (IRA) or another employer’s plan (if it accepts rollovers) (Employee Benefits Security Administration, 2014).

Changing from a traditional defined benefit plan to a cash balance plan creates advantages and disadvantages for the separate stakeholders: employees and employers. Wells Fargo (2012) offers a summary of these advantages and disadvantages in Table 7.

Advantages to Employee	Disadvantages to Employee	Advantages to Employer	Disadvantages to Employer
Accounts earn guaranteed interest rate	Reflects average salary over full career, rather than final compensation	Increase employee understanding and appreciation of retirement benefits	Provide larger benefits for short-service and young employees
Benefits funded without regard to profits	Participant shoulders future risk after receiving lump sum	Simplifies communication to employees	Complexity of converting to this plan, especially the education and communication process, often underestimated
Benefits are portable – benefits can be rolled over to new retirement account		Simplifies retirement plan design, making benefits easier and simpler to calculate	Will create some “winners” and “losers” in ultimate benefits for participants when switching from a traditional plan
Lump sum or annuity options available		Recognizes changing workforce demographics and career patterns	Lump sum payment moves future risk to employee and may not provide enough to maintain employee’s retirement standard of living
Benefits guaranteed by Pension Benefit Guaranty Corporation		Consolidates benefit programs and merges them into a unified plan following merger or acquisition	Administration more involved than traditional DB plans because of tracking requirement for employee work history
		Makes costs under the DB plan more predictable and easier to control	

Table 7. Advantages and Disadvantages for Employers and Employees in Private Sector Cash Balance Defined Benefit Plans (after Wells Fargo, 2012)

Another employee disadvantage associated with cash balance plans is that the guaranteed rate of return is generally less than stock market returns (Rao et al., 2002). According to Kravitz, Inc. (2013), a retirement plan administrator, the interest credit rating most commonly used for cash balance plans is the 30-year Treasury bond, averaging about four to five percent over the past decade. The Internal Revenue Service, however, published new regulations in 2010 allowing the use of the actual rate of return of the assets or fixed rates up to five percent (Kravitz, 2013).

Wells Fargo (2012) describes cash balance plans as being better for companies that retain a young and mobile workforce. The cash balance plan provides significant benefits for younger employees and consequently helps to attract this type of employee. A traditional defined benefit plan tends to favor the older employee who has attained a higher salary and accrued many more years of service (Wells Fargo, 2012). Appendix A contains a detailed comparison of traditional, cash balance, and defined contribution plans.

Cost reduction provides another key motive for private industry companies to switch from a traditional plan to a cash balance plan. The design of a cash balance plan offers more manageable and less volatile costs over time (Wells Fargo, 2012). Additionally, cash balance plans are simpler, and consequently less expensive, to administer than traditional defined benefit plans (Johnston et al., 2011).

3. Defined Contribution

Costo (2006) explained the shift from defined benefit to defined contribution plans in the private industry over the last two decades. This section describes the current defined contribution compensation trends observed within the private sector in 2012 and 2013. The research describes trends in categories appropriate for this thesis. While important to private sector plan management, aspects such as plan expense and fee disclosures are not reported because they are beyond the scope of this thesis. The information and trends presented are based on published survey data from the Plan Sponsor Council of America, HR consultant Aon Hewitt, HR consultant WorldatWork, the American Benefits Institute, Fidelity Investments, and State Street Global Advisors.

a. Enrollment and Participation

In its 56th *Annual Survey of Profit Sharing and 401(k) Plans*, the Plan Sponsor Council of America (PSCA) (2013) found that 87.6 percent of employees maintain a defined contribution account balance and an average of 80.7 percent of employees made contributions to their plans in 2012. WorldatWork and the American Benefits Institute (2013) data support this figure. Their report states that 57 percent of respondents had employee participation rates above 80 percent.

The literature shows an increasing trend for auto-enrollment into the company's retirement plan. Auto-enrollment, as opposed to voluntary enrollment, achieves a much higher participation rate. State Street Global Advisors (2013) found that 57 percent of plans use auto-enrollment, equating to a 16 percent increase from 2010. Companies using auto-enrollment have an average participation rate of 82 percent, compared to 57 percent for those with voluntary enrollment (State Street Global Advisors, 2013). Fidelity Investments (2014) conducted a survey that showed a 17 percent increase in auto-

enrollment usage from 2009. This increase positively affected plan participation rates; with auto-enrollment, 84 percent of employees participated in the company's retirement plan compared to 53 percent participation without auto-enrollment (Fidelity Investments, 2014).

b. Vesting

The PSCA (2013) found that immediate full vesting in the retirement plan is the most common vesting schedule found in the private sector. The survey data showed that 46.4 percent of retirement plans with over 5,000 participants offer immediate full vesting. The next two most-occurring vesting schedules for plans with over 5,000 participants were 5-year graduated vesting and 3-year cliff vesting, representing 18.1 percent and 16.7 percent of plans, respectively (Plan Sponsor Council of America, 2013).

c. Matching Contributions

The two most common company matching formulas use 50 percent of employee deferrals up to six percent and 100 percent of employee deferrals up to six percent, respectively. The current observed trend shows companies shifting from using the 50 percent formula to using the 100 percent formula. For 2008, 50.0 percent of companies matched 50 percent of deferrals and only 25.6 percent of companies matched 100 percent (Plan Sponsor Council of America, 2009). By 2012, the PSCA (2013) results show a decrease to 40.0 percent of companies matching 50 percent of deferrals and an increase to 38.1 percent of companies matching 100 percent of deferrals. The maximum limits vary slightly, but the most observed limit is matching up to six percent of total salary. Table 8 summarizes the PSCA data for the most common formulas used to calculate employer matching contributions. State Street Global Advisors (2013) also found that the most common matching contribution formula was 50 percent up to the first six percent of pay, but in 2013, Aon Hewitt (2013a) found that a formula of 100 percent up to six percent of pay eclipsed the 50 percent up to six percent formula for the first time in 20 years. While the data vary, the trend shows plan sponsors moving toward a matching contribution of 100 percent of pay.

	2008	2012
Total 50% match (all plans)	50.0%	40.0%
Plans up to 6% of pay	29.0%	26.3%
Total 100% match (all plans)	25.6%	38.1%
Plans up to 4% of pay	5.2%	10.9%
Plans up to 5% of pay	3.7%	9.7%
Plans up to 6% of pay	7.0%	9.7%

Table 8. Selected PSCA Data for Most Common Company Matching Formulas (after Plan Sponsor Council of America, 2009; Plan Sponsor Council of America, 2013)

d. Roth Availability

Plan sponsors continue to add Roth 401(k) options to their plans. According to the PSCA (2013), 53.8 percent of plans contained Roth 401(k) options in 2012. This shows an increase from 36.7 percent in 2008 (Plan Sponsor Council of America, 2013). Aon Hewitt (2013a) observed this same trend and attributed the increase to employers recognizing that employees fall into different tax situations. Fidelity Investments (2013) found that the highest percentage of Roth participation came from younger employees in the Millennial generation.

e. Target-Date Funds

Target-date fund usage in 401(k) plans continues to grow. Target-date funds, also referred to as lifecycle or age-based funds, simplify long-term investment by automatically shifting assets from riskier equities to more conservative ones as the fund approaches its “target-date” (Schwartz, 2010). In 2012, 64.5 percent of plans offered target-date funds, while only 33.4 percent of plans offered them in 2006 (Plan Sponsor Council of America, 2009; Plan Sponsor Council of America, 2013). WorldatWork and the American Benefits Institute (2013) found that target-date funds were the most common investment choice for employees, with 68 percent contributing to them. Fidelity Investments (2013) termed this trend as “the growing prevalence of ‘do it for me’ 401(k) options” (p. 3).

Interestingly, VanDerhei, Holden, Alonso, and Bass (2013) noted that younger employees allocated a much higher percentage of assets in target-date funds than older employees. They found that employees aged 20 to 29 allocated 34.2 percent of their assets in target-date funds. Employees aged 40 to 49 only allocated 15.7 percent (VanDerhei et al., 2013). Schwartz (2010) partly attributes target-date funds' increasing popularity to the Pension Protection Act of 2006 allowing them to be used as a default for auto-enrollment plans.

4. Financial Well-Being

The recent financial crisis caused a number of employees to struggle with personal financial issues. These personal issues created some unwillingness and inability to participate in and contribute to an employer's retirement plan (WorldatWork & American Benefits Institute, 2013). Fidelity Investments (2014) noted that 77 percent of their survey respondents did not have "the time or investment knowledge to be confident in their investment decisions" (p. 3). State Street Global Advisors (2013) succinctly described this as "participants are hungry for help" (p. 10). Consequently, Aon Hewitt (2013b) found that "plan sponsors are embracing a more holistic perspective on their retirement programs by focusing on financial wellness and measuring projected retirement income adequacy" (p. 4).

State Street Global Advisors' (2013) data supports the need for financial education. They found that nine percent of participants considered themselves "extremely knowledgeable" and slightly more than a third of respondents described themselves as "fairly knowledgeable." Even with this lack of financial knowledge, 36 percent of their respondents stated that they make their own financial decisions (State Street Global Advisors, 2013).

Plan sponsors continue to focus on their employees' overall financial well-being and are now offering many resources to assist them (Aon Hewitt, 2014). Aon Hewitt (2014) noted that over three-quarters of their respondents indicated that they were either "very likely" or "somewhat likely" to prioritize employees' financial wellness in 2014. Aon Hewitt's (2014) survey of 400 plan sponsors (representing 10 million participants)

found four channels through which employers were expanding their focus on financial well-being. Specifically, these include:

- Offering and promoting services to help employees manage their day-to-day finances
- Providing online modeling tools and mobile applications
- Reviewing and reducing investment fees
- Facilitating access to professionals (Aon Hewitt, 2014, p. 3–4)

With the decrease in defined benefit pension plans and their resulting contribution to retirement income, employers are shifting their guidance from emphasizing the size of contributions to their retirement plan to taking more paternalistic approaches like “outcome-based” retirement plans (Fidelity Investments, 2014). The companies have indicated they intend to educate and advise their workforce on the best implementation of their retirement plan and its potential retirement income (Fidelity Investments, 2014).

D. CHAPTER SUMMARY

Military retirement system reform and modernization began in 1948 with the Hook Commission. More than 65 years and numerous reform commissions later, no meaningful and lasting reforms have been adopted. The current DOD proposal attempts to provide a complete military retirement system modernization by reducing the total amount of the lifetime annuity and replacing it with cash payments and a defined contribution component. Private sector employers continue to shift from defined benefit plans to defined contribution plans. Current private sector trends indicate that employers, most of whom offer defined contribution plans, are concerned with the retirement outcomes of their employees, many of whom do not possess significant financial knowledge. Private sector companies that still offer a defined benefit plan show a trend of switching from traditional defined benefit plans to cash balance plans. Cash balance defined benefit plans offer a hybrid approach that incorporates defined contribution-like aspects, but with a guaranteed outcome, thus providing a more paternalistic alternative than cash payments and contributions to a defined contribution plan.

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IV. PROPOSED ALTERNATIVE

This chapter details an alternative reform for the military retirement system and explains the reasons that make this alternative a viable system. The chapter then describes the methodology used to compare the proposed alternative to both the current system and the Department of Defense (DOD) proposal described in the previous chapter. It describes the calculations performed to create the retired members' annual cash flows under each system. These cash flows then provide the basis for present value (PV) calculations used to compare the three systems. From this point, the retirement system proposed in this thesis is referred to as "the alternative system."

A. ALTERNATIVE SYSTEM

The alternative system is a hybrid system because it contains two separate defined benefit retirement vehicles: a cash balance component and an old age annuity beginning at age 62. The cash balance component was based on research discussed in Chapter III. The DOD proposal described in Chapter III demonstrated the DOD's willingness to provide contributions and bonuses to modernize the military retirement system. As such, these aspects were included into the alternative system's cash balance component. Additionally, the DOD proposal retained an old age annuity similar to the current system. The alternative system leveraged this old age annuity component to maintain some similarity to the current system and to provide a steady retirement income when a retiree exits the labor force.

The alternative system's design provides the service member with an option that provides an annual income similar to the current system for members serving at least 20 years. Consequently, the member would retain the same, if not greater, benefit than the current system. The alternative system's architecture offers a portable benefit to vested members not serving the full 20 years, and allows the member to move that benefit to another retirement plan or individual retirement account (IRA) upon leaving military service. The alternative system creates a force management tool by providing large bonus

contributions periodically throughout a member's career, and it reduces cost by moving large deferred compensation outlays earlier in a member's career.

Service members vest in the cash balance component at 6 years and one day of service, similar to the DOD proposal described in Chapter III, and then vest in the old age annuity after reaching 20 years of service (YOS). Thus, the alternative system provides a retirement benefit to members serving at least six years but not the full 20 years. This alternative system is designed to provide higher contributions into a retirement trust early in a member's career so that those contributions can begin accruing interest and grow in value. To offset these higher initial contributions' cost, the alternative system eliminates the second career annuity, defined as the annuity from military retirement until age 62. Upon retiring after 20 YOS, however, service members may elect to annuitize the cash balance value until age 62 or elect to roll the lump sum value into another retirement plan of their choice. At age 62, the member receives the same retirement benefit as the current. Figure 4 provides the alternative system's graphical depiction.

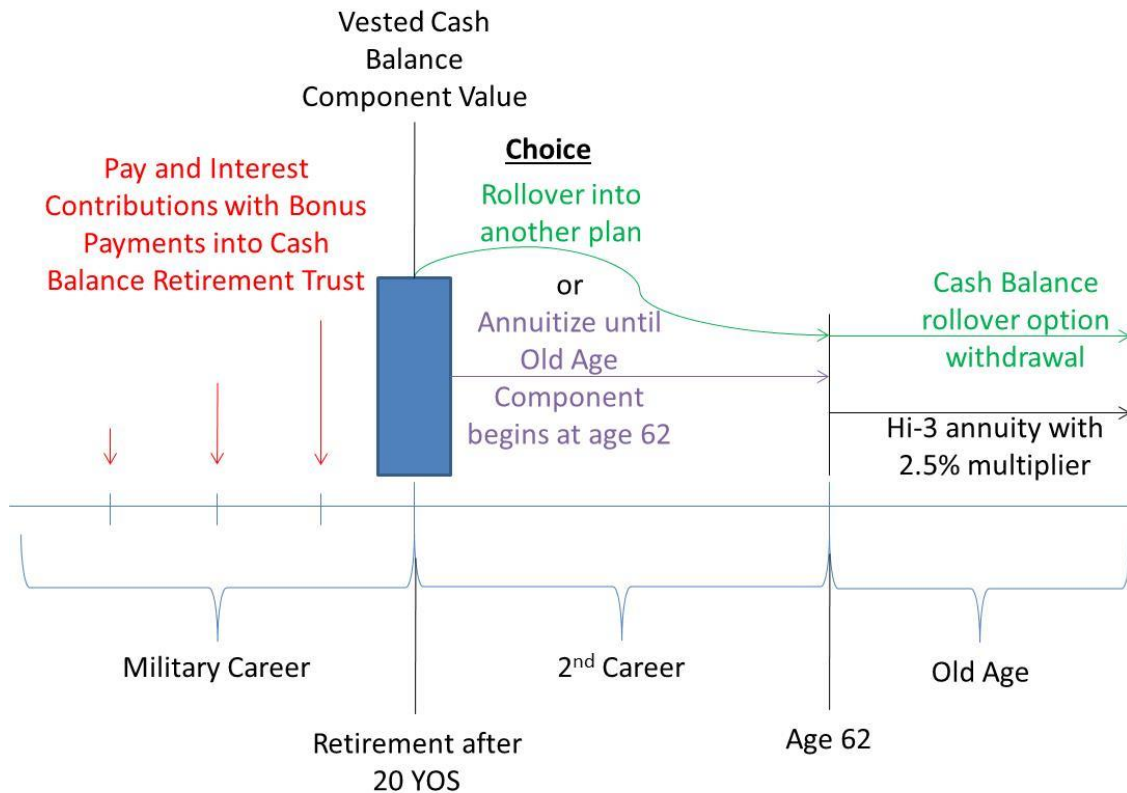


Figure 4. Graphical Depiction of Proposed Alternative Retirement System

Ultimately, the plan design allows for the cash balance annuity option to provide similar annual payments during the second career period to those of the current system. Thus, the service member receives a lifetime benefit similar to the current system. The following sections describe the alternative system's components.

1. Cash Balance Component

The cash balance component provides a guaranteed benefit level. This guaranteed benefit is accomplished by making an annual contribution to a retirement pension-like trust fund on the member's behalf and assuring that accumulated value upon leaving military service. Additionally, the trust fund guarantees a rate of return based on the accumulated value of the notional account and a specific interest rate. While the member does not have an actual individual account, the member is guaranteed the accumulated value that is paid out of the trust. From this point, the annual contribution is referred to as the "pay credit" and the interest payment is referred to as the "interest credit."

a. Pay Credit and Bonuses

The pay credits begin when a member enters into military service. Each year, the government will contribute 15 percent of a member's annual basic pay to the retirement trust based on the member's annual basic pay. This pay credit percentage allows significant growth and recognizes the difficult characteristics associated with military service, such as combat, hazardous duties, family separation, and a spouse's hindered career. The pay credits at the beginning of a member's career will be much less than the pay credits when the member nears retirement, much like a defined contribution system. The pay credits will end after a member reaches 20 YOS, regardless of the member continuing service or retiring. In keeping with the retention goals of the DOD proposal discussed in the previous chapter (DOD, 2014), the member vests in these contributions upon completing six years and one day of service.

To further incentivize retention and reward continued service, large individual bonus contributions will be made at the 6, 10, and 15 YOS points in a member's career. These bonuses will be referred to as "longevity bonuses." The longevity bonuses will be tied to a specific number of months of the member's current basic pay and progressively get larger as the member continues serving. Thus, these bonuses will be protected from inflation, assuming Congress annually adjusts military basic pay for inflation. These large contributions provide the additional principal required to grow the cash balance account to a value that can support a second career annuity similar to the current Hi-3 system.

While beyond the scope of this thesis, the government could require an additional term of obligated service, such as two or three years, for accepting these bonuses to prevent a member exiting military service immediately after receiving a bonus payment. If this policy was implemented, the member would only be two to three years away from the next large bonus after completing the previous obligation. Table 9 shows the longevity bonus payment schedule and values.

Bonus Payment Schedule (YOS)	Value (months of basic pay)
6	2
10	18
15	24

Table 9. Alternative System's Longevity Bonus Payments

In keeping with a cash balance plan design, each pay credit and bonus will be placed into a retirement pension-like trust fund that is managed by professional retirement plan managers. Thus, knowledgeable financial managers will control the trust fund's investments to achieve the desired return on its investments.

The retirement trust fund will be subject to stock and bond market volatility. As mentioned in the previous chapter, private sector cash balance plans can record their funds' excess returns as profit for the plan sponsors. During times when the pension trust returns a higher rate than required, the excess can be retained within the fund to help cover future potential liabilities. During down stock and bond markets, the government, via the trust fund, will hold the risk to provide the members' guaranteed account value, but be able to partially offset these liabilities by the previous years' excess returns.

b. Interest Credit

The government designates a guaranteed annual rate of return on the member's accumulated account value and credits that return to the account. At the end of the year, an interest credit equal to the cash balance account value multiplied by the specified interest credit rate will be added to the total account value. Thus, the total accumulated value at the beginning of the following year will be equal to the accumulated value at the start of the previous year plus the annual pay credit and any bonus (if in year 6, 10, or 15) plus the interest credit given to the cash balance account. To mitigate the potential future liability associated with stock and bond market volatility, the designated interest credit rate will be tied to a conservative rate such as the 30-year Treasury yield. Additionally, members continuing service beyond 20 years will continue to receive an annual interest

credit as their account value continues to appreciate, even though the pay credits stopped at 20 YOS. Table 10 summarizes the architecture of the cash balance component.

Cash Balance Component		Notes
Vests	6 years and 1 day	
Pay Credit	15% of Annual Basic Pay	Begins at military entry; Ends at 20 YOS
Bonuses	6, 10, and 15 YOS	Specific number of months basic pay
Interest Credit	Tied to Interest Credit Rate	Typically 30-year Treasury yield; Members over 20 YOS still credited annually
Accumulated Value	Previous Account Value + Annual Pay Credit + <i>Bonus</i> + Interest Credit	

Table 10. Summary of Cash Balance Component for the Alternative Plan

c. Cash Balance Options

Upon full retirement (20 YOS), the member has the choice to either annuitize the value of the cash balance account or roll the lump sum value into another retirement plan. The annuity length is from the time a member leaves the service until age 62. The government contributions (pay credits and bonuses) and interest credits are designed to provide an annuitized retirement income similar to the current system. This option is beneficial to retiring members desiring an immediate retirement income similar to the current system.

Alternately, the retiring service member can take the lump sum value and invest it in a future employer's retirement plan or an IRA. This option allows a retiree who does not desire an immediate retirement income to let the lump sum value continue to grow until the retiree fully exits the labor force. For simplicity, it is assumed in this thesis that the member exits the labor force at age 62. After exiting the labor force, the retiree can

then begin withdrawals from this rollover retirement account. Vested members serving less than 20 YOS fall under this rollover option.

2. Old Age Annuity

The old age annuity begins at age 62 and continues for the life of the retiree. A service member vests in this component after 20 YOS. The annuity benefit uses the same Hi-3 base and 2.5 percent multiplier as the current system to calculate the annuity payments. Thus, a member serving greater than 20 years still receives a larger benefit in this stage of retirement than a member serving 20 years. This component provides a steady retirement income after the retiree exits the labor force and can use the established Military Retirement Fund to provide the required payments.

3. Advantages

The alternative system offers a conservative approach to military retirement modernization that contains advantages over the other two systems. The alternative system is designed to reduce the overall system cost, but provide a similar, consistent benefit to the retiree. During retirement, the retiree should see a similar, if not better, annual income with the alternative system.

The large longevity bonuses are intended to incentivize and reward continued service and provide a force management tool. Contributing the bonuses to a cash balance plan removes the member's ability to use the money for non-retirement expenditures such as buying a new car while still serving. The bonuses can then grow in a managed account and be used in retirement as they were intended. Investing the bonus for the member instead of paying the bonus in cash provides a conservative approach to compensation.

The cash balance trust provides a managed account that guarantees growth. The managed account gives an investment vehicle that accounts for a member's potential deficiency in financial and investment knowledge. From the member's perspective, this removes most of the risk associated with a defined contribution account. The member will have a guaranteed value for retirement income. The retirement trust also offers a paternalistic approach by managing the account on behalf of the member.

The cash balance account offers a portable benefit similar to retirement plans found in the private sector. After vesting, the member can transition the account balance to another retirement plan upon leaving the military. The cash balance account also gives a member retiring at 20 YOS a choice of how to claim the benefit: annuitize or continue investing to let the balance grow.

The 15 percent contribution rate is greater than twice the average private sector defined contribution discussed in Chapter III. This large compensation could serve as a recruitment and retention tool for force managers.

4. Disadvantages

The alternative system does contain disadvantages for the government and individual member when compared to the DOD proposal described in the previous chapter. First, the alternative system places the risk on the government, via the cash balance retirement trust, to achieve the four percent returns required to pay the four percent interest credit. This risk may be mitigated by reinvesting returns from “up” years to cover liabilities from “down” years.

Second, the cash balance plan removes some choice from the member when compared to the DOD proposal. The managed account does not allow the member to determine how the cash balance account is invested. The tradeoff occurs, however, because the cash balance account value is guaranteed instead of being susceptible to fluctuations in the stock and bond markets.

Lastly, contributing the longevity bonuses to the cash balance account defers that compensation until a later date. This deferral does not satisfy a member’s desire for current compensation. Members, however, can view their notional account values and see a large increase in them. This provides some recognition of current compensation. As stated previously, these managed bonus contributions add to the alternative system’s conservative nature.

B. METHODOLOGY

The alternative system was compared to the current military retirement system and the DOD proposal described in Chapter III. From this point, the DOD proposal is referred to as the “DOD system.” To achieve comparability, the annual cash flows for each system were calculated and then discounted to show the present value (PV) of each system at retirement. The calculated PV shows a single value that represents the present value sum of different cash flows, and is calculated using the Discounted Cash Flow (DCF) equation (Brealey, Myers, & Allen, 2011). The calculations were conducted from the viewpoint of maintaining a similar retirement income for the retiree; thus, the highest PV gives the best option for the retiree. Additionally, the alternative system’s cost savings compared to the current system were estimated.

1. Assumptions

The officer and enlisted basic pay tables for 2012 through 2014 provided the basis for all calculations. To simplify the calculations, inflation was not included as a variable. It was assumed that basic pay will be increased to match inflation. As such, the calculations do not provide absolute estimates, but do offer a relative system comparison using the same inputs. The following sections explain the calculations performed.

The DOD system’s published self-assessment based its calculations on two career paths: an O-5 serving 20 years and an E-7 serving 20 years (DOD, 2014). The same two career paths were used to provide a comparable benefit estimation for each system. Accordingly, it was assumed in this thesis that the O-5 entered service at age 23 and retired at age 43, and the E-7 entered service at age 20 and retired at age 40. These two careers require second career annuities for 19 and 22 years, respectively. Consequently, the respective annuities require larger cash balance account values to provide a similar benefit to the current system during the second career retirement phase. In order to provide a sensitivity analysis, the benefits for an O-6 serving 30 years and an E-9 serving 30 years were calculated.

Additionally, the DOD system contained a continuation bonus that amounted to a cash payment at a specified YOS milestone. The DOD self-assessment did not include

this bonus in its calculations because of the varying nature of the payments (DOD, 2014). Consequently, this continuation bonus was not included in the DOD system model.

2. Contribution Calculations

The alternative and DOD systems both contain contributions that gradually increase in value as service members progress through their careers. To determine these contributions' annual value, a standard promotion schedule based on YOS for both officers and enlisted personnel was used, regardless of officer promotion board results, enlisted advancement exam results, or branch of service. The model assumes that all service members promote to the next pay grade after achieving the appropriate time in the previous rank. The promotion schedule stops at 30 YOS. To simplify calculations, officers with previous enlisted service and warrant officers were excluded, as were general officers. Tables 11 and 12 depict the model's promotion schedule for officers and enlisted personnel.

Pay Grade	Time in Grade (years)	Cumulative Time in Service (years)
O-1	1.5	1.5
O-2	2.5	4
O-3	6	10
O-4	6	16
O-5	6	22
O-6	8	30

Table 11. Officer Promotion Schedule (after Powers, 2012b)

Pay Grade	Time in Grade (years)	Cumulative Time in Service (years)
E-1	0.5	0.5
E-2	1	1.5
E-3	1	2.5
E-4	2	4.5
E-5	5.5	10
E-6	4.5	14.5
E-7	3.5	18
E-8	3	21
E-9	9	30

Table 12. Enlisted Personnel Promotion Schedule (after Powers, 2012a)

To calculate a member's annual pay, the model assumed the corresponding rank for each cumulative year in service found in Tables 10 and 11. For example, an enlisted member at 8 YOS was assumed to be at the E-5 pay grade. For years that were split between pay grades, the annual pay was calculated by using half a year's pay in the lower rank and half a year's pay at the higher rank, providing an average for the year. Subsequently, the model created a notional annual pay scale for a member based on 2014 basic pay rates and these promotion schedules

The thesis incorporated the calculated notional pay scale and both systems' contribution rates to determine the annual contributions for the respective systems. For example, if the notional annual basic pay was \$50,000 for the service member, the alternative system made a \$7,500 contribution based on the 15 percent contribution rate. Similarly, the DOD system used a five percent rate to give a \$2,500 contribution, beginning after two YOS (DOD, 2014).

A growth rate was applied to both systems' accumulated contribution values. For the alternative system, the interest credit was calculated by adding four percent of the previous year's account value to the accumulated contribution value. For example, a previous year's \$10,000 accumulated account value earned a \$400 interest credit to give a total cash balance account value of \$10,400 in the current year. A similar calculation was made for the DOD system using a five percent annual growth rate for the Thrift Savings

Plan (TSP) (DOD, 2014). The total accumulated value for each contribution account provided the present value at retirement for the respective systems' cash balance and TSP accounts.

3. Discount Rate

The discount rate adjusts future cash flows into present value terms. It accounts for the time value of money, which can be described as \$100 today is worth more than \$100 next year (Brealey, Myers, & Allen, 2011). The DOD Office of the Actuary used a 5.75 percent discount rate to calculate the value of the fiscal year 2011 military retirement system, but annotated that a 5.5 percent discount rate would be used in the next valuation of the retirement system (DOD Office of the Actuary, 2013). Thus, a 5.5 percent discount rate was used as the basis for the present value calculations in this thesis. Additionally, Warner and Pleeter's (2001) study of the military downsizing in the 1990s showed that military members may have personal discount rates up to 18 percent. Thus, 18 percent was used as the upper bound for a sensitivity analysis of the discount rate's effect on present value.

4. Present and Future Value Calculations

All three systems required present value, future value, or a combination of both calculations. To calculate the PV of the current retirement benefit and the old age annuities of the alternative and DOD systems, the monthly payout, based on the Hi-3 system with a 2.5 percent multiplier, was multiplied by 12 to give the annual annuity benefit. This value was used as the annual cash flow for the annuity. The following equation calculated the present value of the annuity at its beginning:

$$PV_{Annuity} = \frac{C}{d} * \left[1 - \frac{1}{(1+d)^t} \right] \quad (1)$$

Where C is the annuity cash payment, d is the discount rate, and t is the number of periods in the annuity (Brealey, Myers, & Allen, 2011). Equation 1 provided the full PV at retirement age for a service member using the current system; it also gave the second career annuity's PV (at retirement age) used in the DOD system.

For the alternative and DOD old age annuities, the PV calculated from equation 1 was further discounted from the age at which the old annuity began to the military retirement age. The following equation was used to discount the annuity PV at old age to the PV at retirement age:

$$PV = \frac{FV_{Annuity}}{(1+d)^t} \quad (2)$$

Where $FV_{Annuity}$ equals PV of the old age annuity at the old age start, d is the discount rate, and t is the number of years between military retirement and the old age annuity beginning (Brealey, Myers, & Allen, 2011). The calculated PV of the old age annuity from Equation 1 was used as the $FV_{Annuity}$ variable in Equation 2.

The DOD system's TSP account value was modeled to grow at a five percent interest rate from military retirement until old age (65). Equation 2 was algebraically rearranged to give the calculated future value using the following equation:

$$FV_{TSP} = PV_{TSP}(1+g)^t \quad (3)$$

Where PV_{TSP} equals the value of the TSP account at military retirement, g is the growth rate, and t is the number of years from military retirement to age 65.

Finally, the cash balance lump sum value (alternative system), transition payment (DOD system) and TSP account (DOD system) were converted into annuity cash flows for defined lengths. Algebraically rearranging Equation 1 gave the formula for calculating the annuitized cash flows, reflected in the following equation:

$$C = \frac{(B)(r)}{\left[1 - \frac{1}{(1+r)^t}\right]} \quad (4)$$

Where B is the principal value of the cash balance account, transition payment, or TSP account; r is the interest rate; and t is the annuity length in years. The cash balance account and transition payment were annuitized from military retirement age to the old age annuity beginning. The TSP account was annuitized from the DOD old age annuity start (age 65) until age 85 to maintain comparability to the DOD self-assessment described in Chapter III. Combining these annuity values with the annuities based on Hi-

3 gave the annual cash flows generated by each system. Table 13 summarizes the components and timelines used to calculate the annual individual cash flows.

Model	Cash Flow Component	Value Used in Calculation	Age Length (t) [†]	Interest Rate (r)
Current System	Hi-3	$2.5\% * \text{Hi-3} * \text{YOS}$	Retirement–85	NA
Alternative System	Cash Balance Annuity ^{††}	Cash Balance Lump Sum	Retirement–62	4.0%
	Old Age Annuity	$2.5\% * \text{Hi-3} * \text{YOS}$	62–85	NA
DOD System	Transition Payment Annuity	$2.5 * \text{Final Month's Basic Pay}$	Retirement–65	4%
	Second Career Annuity	$2.5\% * \text{Hi-3} * \text{YOS}$ (capped at 25%)	Retirement–65	NA
	TSP Account Annuity	TSP Lump Sum ^{†††}	65–85	4%
	Old Age Annuity	$2.5\% * \text{Hi-3} * \text{YOS}$	65–85	NA
†Officer military retirement age is 43, enlisted personnel retirement age is 40.				
††Member also has option to roll lump sum into another retirement plan.				
†††Assumed 5% growth from retirement until age 65.				

Table 13. Summary of Individual Cash Flow Components Generated by Each System.

5. Cost Calculation

The current and alternative systems' costs were approximated to provide another comparison method. The DOD system's cost was not calculated due to a lack of data regarding the second career annuity and actual Hi-3 values for service members in this period. As such, the DOD system's second career annuity could not be precisely estimated, and the DOD system's cost was excluded from this analysis.

The annual outlay for non-disability retirement benefits was calculated for the second career portion of the current system. The DOD Office of the Actuary's (2013) *Valuation of the Military Retirement System—September 30, 2011* provided the average outlays for fiscal year 2011 within the relevant range for the alternative system's second career. The officer outlays for members between ages 43 and 62 and enlisted personnel outlays between ages 40 and 62 were used to approximate the current cost of the second career portion of the current system. The combined officer and enlisted total outlay offered a basis from which to compare the alternative system to the current system.

The 2014 basic pay scale, 2011 force manning numbers, and previously described average career promotion schedules were used to calculate the estimated outlays attributed to the alternative system's pay credit and longevity bonus portions of the respective systems. The DOD Office of the Actuary's (2013) *Valuation of the Military Retirement System—September 30, 2011* provided the 2011 force manning numbers for officers and enlisted personnel at each YOS.

The alternative system's cost estimate did not include the interest credit payments. It was assumed that the return on the trust would provide the four percent interest credit and was not included in the cost estimation.

C. CHAPTER SUMMARY

This chapter explained the alternative military retirement system proposed in this thesis and described the calculations performed to compare it to the current retirement system and one proposed by the DOD. The alternative system provides deferred compensation payments early in a member's career and allows the payments to grow in a retirement trust prior to the member receiving them. The alternative system also offers an earlier vesting time that gives a service member who does not serve the full 20 YOS a portable benefit that can be moved into another retirement account.

This chapter explained the methodology used to model the annual retirement cash payments for each system. The PV and annuity calculations provided individual payments during corresponding periods of a retiree's lifetime. These individual payments were summed to show the combined annual retirement income. Additionally, the method used to estimate and compare the current and alternative systems' cost was explained in this chapter.

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V. RESULTS AND ANALYSIS

A. INTRODUCTION

This chapter explains the results from calculations performed to compare the three systems. The chapter presents the three systems' annual payments made to the individual as well as the cumulative lifetime payments. From those payments, the systems' present values (PV) are then compared using the 5.5 percent discount rate determined in the previous chapter. To further compare PVs, the chapter also includes each system's present values at every year of service (YOS) during a 20-year career, for both officers and enlisted personnel.

The chapter includes sensitivity analyses and a cost comparison to the current system. The first sensitivity analysis shows the discount rate's effect on PV and the corresponding indifference points between the alternative system and the other systems. The second sensitivity analysis shows the alternative system's annual retirement payments for members serving 30 years. This shows that a member receives an increased retirement benefit for longer service using the alternative system.

The chapter concludes with the estimated cost comparison between the alternative system and the current system. This shows that the alternative system can reduce the military retirement system's cost while still providing a benefit similar to the current system.

B. CASH FLOW RESULTS

1. Current System

The basic pay tables from 2012, 2013, and 2014 were used to calculate the highest three years' average basic pay (Hi-3) for an E-7 and an O-5 retiring at 20 YOS. Those values were multiplied by the 2.5 percent multiplier and 20 YOS to give the annual retirement income for those service members. Table 14 shows the current system's retirement benefits for an E-7 and O-5 retiring after 20 YOS.

Pay Grade	Hi-3 Annual Annuity Payment (20 YOS)
E-7	\$25,724
O-5	\$49,045

Table 14. Annual Retirement Payment for an E-7 and an O-5 Retiring in 2014 after 20 YOS

2. Alternative System

The alternative system contained two sources of cash flows: the cash balance plan and the Hi-3 old age annuity. The model first calculated the annual cash balance component's pay credits, interest credits, and longevity bonuses allocated to the service member throughout a 20-year career. The model showed that an officer would accumulate a cash balance account value of \$734,774 and an enlisted member would achieve a value of \$382,896. Figure 5 shows the alternative model's cash balance value for both an officer and enlisted member at each YOS.

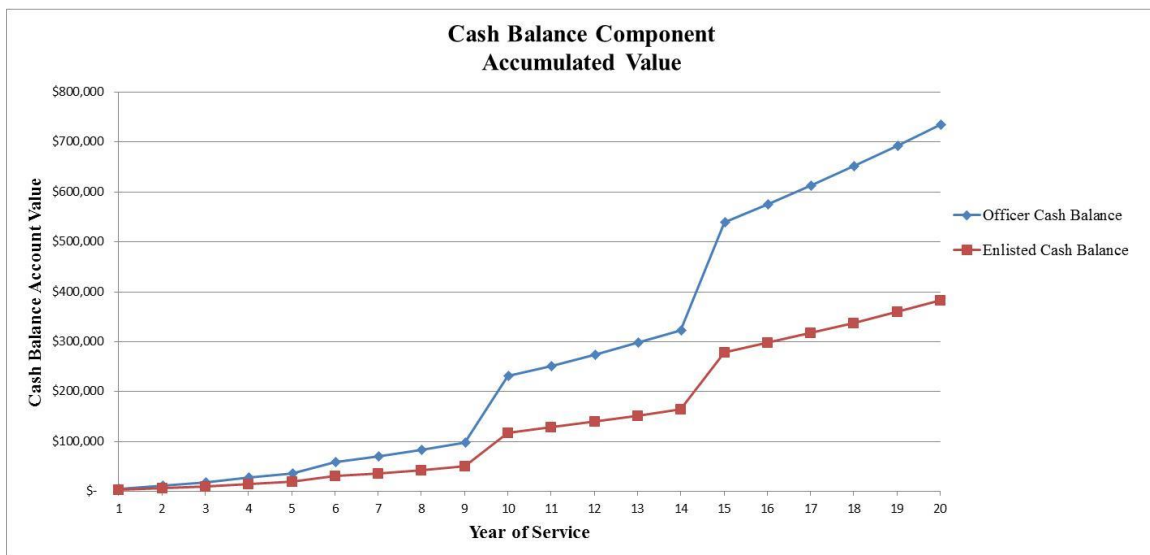


Figure 5. Growth of Cash Balance Account Value at Each YOS

In Figure 5, the slopes of the lines gradually increase as the member promotes into higher pay grades and consequently receives larger pay credit amounts. The

longevity bonuses account for the distinct increases at years 6, 10, and 15. Tables 15 and 16 show the values for an officer's account and an enlisted member's account.

YOS	Annual Pay Credit	Annual Interest Credit	Longevity Bonus	Total Value
1	\$ 5,229	\$ 209	\$ -	\$ 5,439
2	\$ 5,627	\$ 218	\$ -	\$ 11,283
3	\$ 6,862	\$ 451	\$ -	\$ 18,596
4	\$ 7,903	\$ 744	\$ -	\$ 27,243
5	\$ 8,531	\$ 1,090	\$ -	\$ 36,864
6	\$ 9,748	\$ 1,475	\$ 10,831	\$ 58,917
7	\$ 9,748	\$ 2,357	\$ -	\$ 71,021
8	\$ 10,237	\$ 2,841	\$ -	\$ 84,099
9	\$ 10,237	\$ 3,364	\$ -	\$ 97,699
10	\$ 10,553	\$ 3,908	\$ 118,676	\$ 230,836
11	\$ 11,868	\$ 9,233	\$ -	\$ 251,937
12	\$ 12,458	\$ 10,077	\$ -	\$ 274,473
13	\$ 12,458	\$ 10,979	\$ -	\$ 297,910
14	\$ 12,869	\$ 11,916	\$ -	\$ 322,696
15	\$ 12,869	\$ 12,908	\$ 191,376	\$ 539,849
16	\$ 13,120	\$ 21,594	\$ -	\$ 574,562
17	\$ 14,353	\$ 22,982	\$ -	\$ 611,898
18	\$ 14,759	\$ 24,476	\$ -	\$ 651,133
19	\$ 14,759	\$ 26,045	\$ -	\$ 691,937
20	\$ 15,160	\$ 27,677	\$ -	\$ 734,774
Total	\$ 219,347	\$ 194,545	\$ 320,882	\$ 734,774

Table 15. Annual Contributions to an Officer's Cash Balance Account

As shown in Table 15, the longevity bonuses provide the highest cumulative contributions to the cash balance account. This provides an incentive for members to accept these bonuses and remain in active service. For example, officers leaving after 8 YOS will receive their vested account value of \$84,099. If those same officers were to serve an additional four years and leave after 12 YOS, however, they would receive \$274,473, a 226 percent increase. This provides a notable retention tool. Either way, the

officer would receive a competitive benefit compared to the private sector's standard matching, up to six percent.

YOS	Annual Pay Credit	Annual Interest Credit	Longevity Bonus	Total Value
1	\$ 2,924	\$ 117	\$ -	\$ 3,041
2	\$ 3,170	\$ 122	\$ -	\$ 6,332
3	\$ 3,619	\$ 253	\$ -	\$ 10,204
4	\$ 3,988	\$ 408	\$ -	\$ 14,601
5	\$ 4,190	\$ 584	\$ -	\$ 19,375
6	\$ 4,922	\$ 775	\$ 5,469	\$ 30,541
7	\$ 4,922	\$ 1,222	\$ -	\$ 36,685
8	\$ 5,260	\$ 1,467	\$ -	\$ 43,412
9	\$ 5,260	\$ 1,736	\$ -	\$ 50,409
10	\$ 5,537	\$ 2,016	\$ 59,967	\$ 117,930
11	\$ 5,997	\$ 4,717	\$ -	\$ 128,643
12	\$ 6,355	\$ 5,146	\$ -	\$ 140,144
13	\$ 6,355	\$ 5,606	\$ -	\$ 152,104
14	\$ 6,464	\$ 6,084	\$ -	\$ 164,653
15	\$ 6,908	\$ 6,586	\$ 100,807	\$ 278,954
16	\$ 7,561	\$ 11,158	\$ -	\$ 297,673
17	\$ 7,561	\$ 11,907	\$ -	\$ 317,140
18	\$ 7,783	\$ 12,686	\$ -	\$ 337,609
19	\$ 8,582	\$ 13,504	\$ -	\$ 359,695
20	\$ 8,813	\$ 14,388	\$ -	\$ 382,896
Total	\$ 116,170	\$ 100,483	\$ 166,243	\$ 382,896

Table 16. Annual Contributions to an Enlisted Member's Cash Balance Account

Table 15 shows that enlisted members will also receive a notable retirement benefit from the cash balance component. Similar to officers, enlisted members staying on active duty until 12 YOS will receive a 223-percent larger benefit than if they left military service after 8 YOS. After vesting, an enlisted member departing active duty service will receive a benefit larger than one received from a private sector employer matching six percent of similar compensation.

The cash balance account values were converted into annuity payments to determine the annual cash flow generated by their values. As described in Chapter IV, the annuity calculation assumed a four percent interest rate and paid at the end of the year. The model used an annuity length of 22 years for an enlisted member because the member was assumed to retire at age 40 and then receive the old age annuity at age 62. Similarly, the model calculated an officer's annuity for 19 years because it assumed retirement at age 43. The annuity calculations were based on account balances of \$734,774 and \$382,896 for an O-5 and an E-7, respectively. The second career annual annuities equated to \$55,945 for the O-5 and \$26,496 for the E-7.

The old age annuity used the same values previously calculated for the current system and began at age 62. From Table 14, the old age annuities equaled \$25,724 for an E-7 and \$49,045 for an O-5. Table 17 summarizes the cash balance annuitized cash flow and old age annuity.

Pay Grade	Cash-Balance Annuity (Retirement-62)	Old Age Annuity (62+)
E-7	\$26,496	\$25,724
O-5	\$55,945	\$49,045

Table 17. Alternative System Annuities with Cash Balance Annuity Option

As Table 17 shows, the annuitized cash balance value is greater for both an E-7 and an O-5. Thus, the cash flow generated by the alternative system will surpass the current system's benefit, and give the member a higher retirement income than the current system. An E-7's second career income is three percent higher and an O-5's income is 14 percent higher. The O-5's larger benefit increase stems from annuitizing the cash balance account for three fewer years.

The cash balance rollover option was calculated to grow at five percent until the retiree reached the old age annuity. For the O-5, the cash balance value at age 62 is \$1,856,738. For the E-7, the cash balance value at age 62 is \$1,120,071. Annuitizing

these values from age 62 to 85 yielded annuity payments of \$124,975 and \$75,391, respectively. These values were then added to the old age annuity to generate the retiree's cash flows. Table 18 summarizes these payments.

Pay Grade	2nd Career Annuity (Retirement–62)	Old Age Annuity (62+)
E-7	\$0	\$101,115
O-5	\$0	\$174,020

Table 18. Alternative System Annuities with Cash Balance Rollover Option

The rollover option provides a larger benefit after the member leaves the labor force. With members' preference for current compensation, however, it is expected that a majority of retirees will elect to take the annuity option.

3. Department of Defense System

The DOD system contained four income sources: a transition bonus, a second career annuity, an old age annuity, and a TSP account. The transition bonus and second career annuity provided the annual income from military retirement until age 65. Then, the old age annuity and TSP account provided a retiree's annual income from age 65 until age 85. The transition bonus and TSP accounts were annuitized to provide the maximum annual cash flows during their respective periods.

The transition bonus for E-7s and O-5s with 20 YOS amounted to 2.5 times their final basic pay. Using the 2014 basic pay table, these bonuses amounted to \$146,889 for an E-7 and \$252,666 for an O-5. It was assumed that the entire transition bonus amount was converted into an annuity. Due to the assumed difference in retirement age, an E-7's annuity lasted 25 years (age 40 to 65) and an O-5's annuity lasted 22 years (age 43 to 65). Assuming a four percent interest rate, the annuitized values equaled \$9,403 and \$17,848, respectively. If a member did not convert the full amount, the annuity would be less than calculated.

The DOD system caps the second career annuity at 25 percent of Hi-3 pay. The second career bonus was calculated by taking the current system's annuity and dividing by two, which gave the equivalent of 25 percent of Hi-3 for a member retiring at 20 YOS. For an E-7 and O-5, these annuities equaled \$12,862 and \$24,523, respectively. Combining these annuities with the transition bonus annuities gave an annual retirement income during a member's second career stage of \$22,265 and \$42,007, respectively.

The TSP account provided an annual income from age 65 until age 85. The TSP contributions, however, were made during the member's career and allowed to grow at five percent until age 65. This appreciated TSP account value gave the principal for the annuity. Beginning at two years of service, the five percent contribution gave an E-7 a TSP account value of \$57,474 at 20 YOS. Similarly, an O-5's TSP account attained a value of \$107,509 at 20 YOS. Figure 6 shows the progressing value of each TSP account.

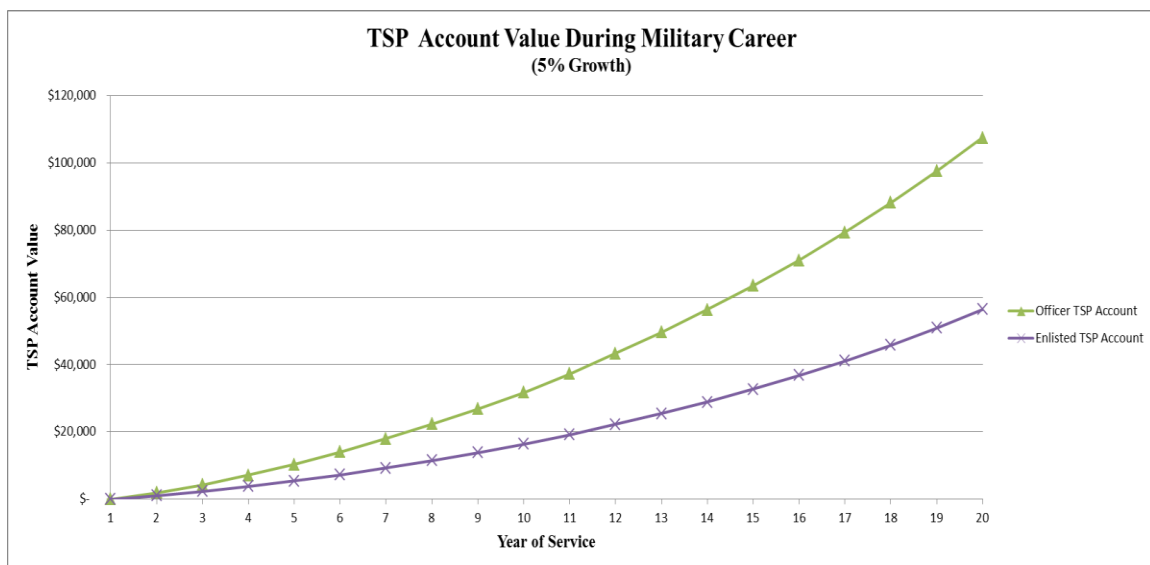


Figure 6. TSP Account Value during Military Career

The TSP contributions ended at 20 YOS and growth was calculated at five percent annually. This growth led to an E-7's TSP account being valued at \$191,092 and an O-5's TSP account being valued at \$314,492. These two values provided the respective principals to calculate the annuities from age 65 to 85. Using a four percent

interest rate, the E-7's annual annuity amounted to \$14,061 and the O-5's annual annuity equaled \$23,141.

The DOD system's final component came from the same Hi-3 old age annuity as the other two systems. These annuities were \$25,724 for an E-7 and \$49,045 for an O-5. Combining the old age annuities with the annuitized TSP account provided the annual retiree income from age 65 to age 85. Thus, during old age, an E-7 retiree would have an annual income of \$39,785 and an O-5 retiree would have an annual income of \$72,186. Table 19 summarizes the DOD system's components and annual cash flows.

E-7/20	2nd Career Income (Retirement-65)	Old Age Income (65+)
Transition Bonus	\$9,403	\$0
2nd Career Annuity	\$12,862	\$0
TSP Annuity	\$0	\$14,061
Old Age Annuity	\$0	\$25,724
Total	\$22,265	\$39,785
O-5/20	2nd Career Income (Retirement-65)	Old Age Income (65+)
Transition Bonus	\$17,484	\$0
2nd Career Annuity	\$24,523	\$0
TSP Annuity	\$0	\$23,141
Old Age Annuity	\$0	\$49,045
Total	\$42,007	\$72,186

Table 19. Summary of DOD System's Components and Retirement Income

4. Cash Flow Comparison

The three systems provide three different undiscounted annual cash flows. The current system was used as the baseline to compare to the alternative and DOD systems. The alternative system provided a marginally higher annual retirement income during the second career stage and then the same income during the old age stage. The DOD system

offered a lower annual income during the second career stage and then a higher annual income during the old age stage. Table 20 compares the annual incomes for all three systems.

E-7/20	2nd Career Annual Income	Difference from Current System	Old Age Annual Income	Difference from Current System
Current System	\$25,724	\$0	\$25,724	\$0
Alternative System	\$26,496	\$772	\$25,724	\$0
DOD System	\$22,265	-\$3,459	\$39,785	\$14,061
O-5/20	2nd Career Annual Income	Difference from Current System	Old Age Annual Income	Difference from Current System
Current System	\$49,045	\$0	\$49,045	\$0
Alternative System	\$55,945	\$6,900	\$49,045	\$0
DOD System	\$42,007	-\$7,038	\$72,186	\$23,141

Table 20. Undiscounted Annual Income Summary for Each System

The systems' undiscounted cumulative lifetime earnings offer another method to compare the three systems. Adding the annual incomes from retirement to age 85 provided this comparison. The current system generated a lifetime total income of \$1,183,295 for the E-7 and \$2,108,944 for the O-5. The alternative system provided marginally higher earnings, \$1,200,282 and \$2,240,034, respectively. The DOD system created the highest lifetime earnings with \$1,392,092 and \$2,440,057, respectively. Table 21 summarizes the undiscounted lifetime earnings.

	Lifetime Retirement Earnings		
System	Current	Alternative	DOD
E-7/20*	\$1,183,295	\$1,200,282	\$1,392,092
O-5/20**	\$2,108,944	\$2,240,034	\$2,440,057
* Lifetime is age 40 to 85.			
** Lifetime is age 43 to 85.			

Table 21. Total Undiscounted Lifetime Retirement Earnings

The DOD system generates the highest total undiscounted lifetime earnings of all three systems. It gives the E-7 a 17.6 percent increase and the O-5 a 15.7 percent increase

in lifetime earnings compared to the current system. The alternative system provides a marginally higher benefit, 1.4 percent for the E-7 and 6.2 percent for the O-5, than the current system.

The biggest difference in lifetime accumulation occurs with the benefit distributions' timings. The DOD system provides a lower benefit during a retiree's second career and then a higher benefit during old age, thus allowing the deferred benefit to grow in value. Conversely, by design, the alternative system distributes the retiree's benefits more evenly through retirement, providing a consistent retirement income. Figures 7 and 8 show these distributions compared to the current system.

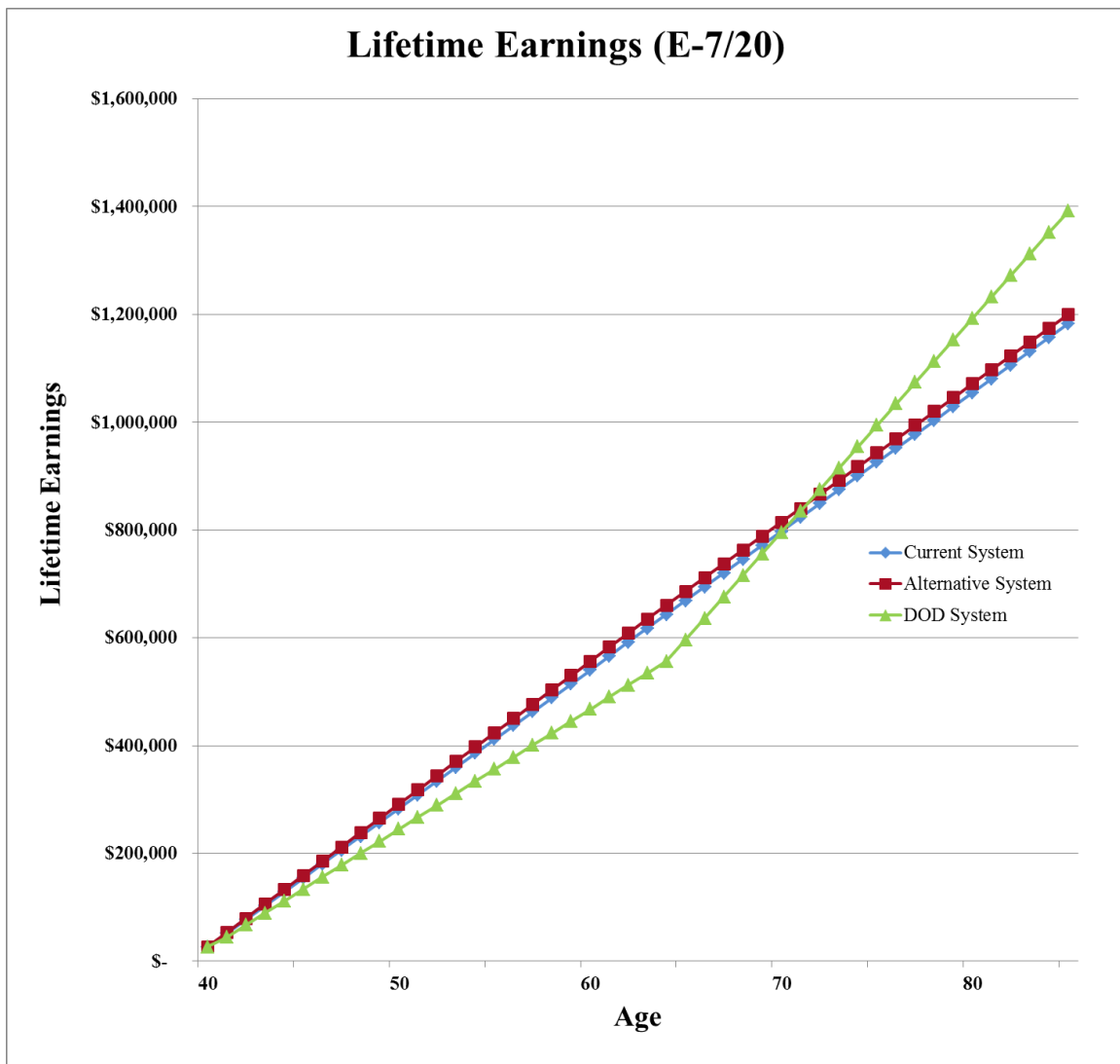


Figure 7. Undiscounted Lifetime Earnings of Each System for an E-7 Retiring at 20 YOS

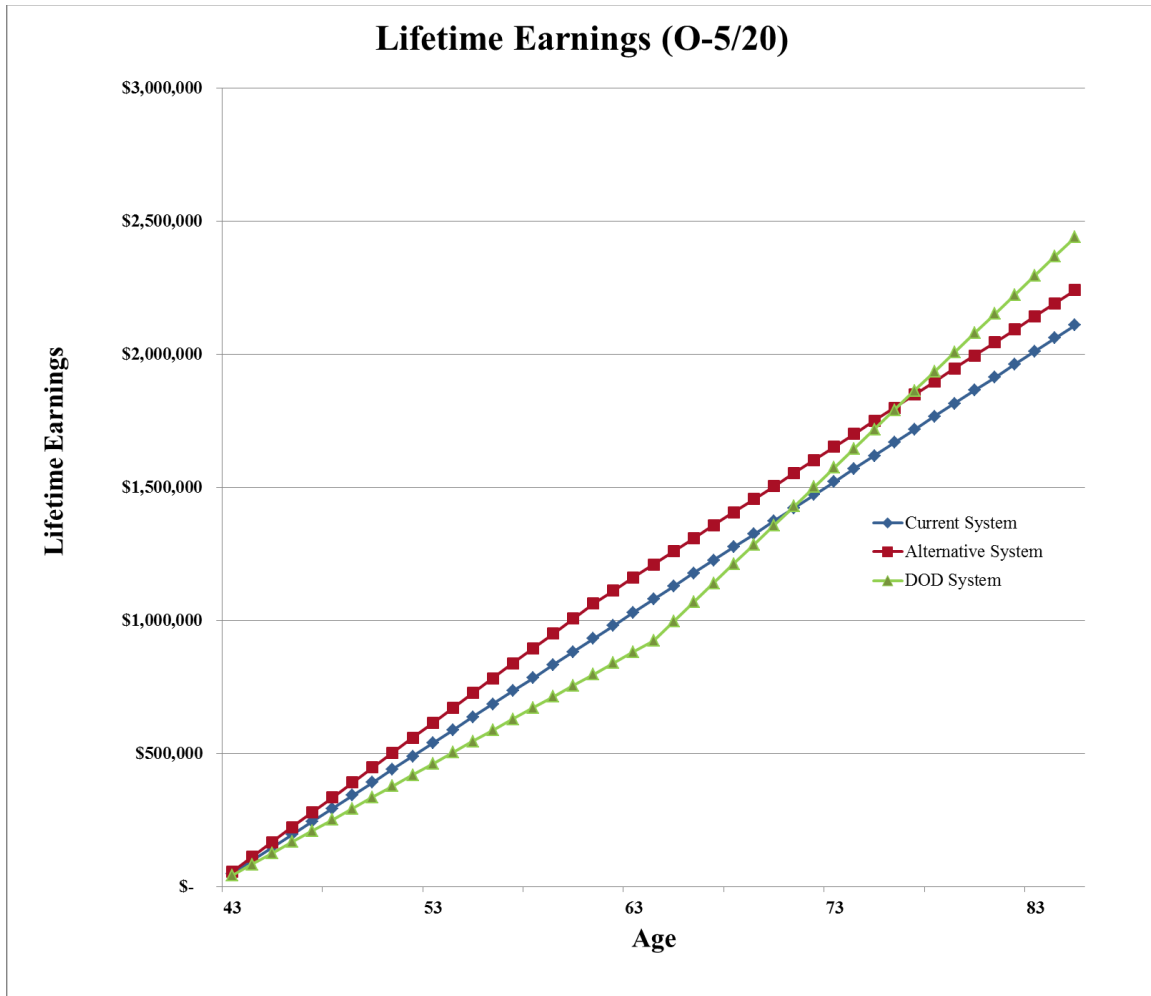


Figure 8. Undiscounted Lifetime Earnings for an O-5 Retiring at 20 YOS

As Figures 7 and 8 show, the alternative system provides a consistent retirement income that marginally surpasses the current system in total lifetime payments. The DOD system generates the highest total lifetime payments based on this analysis. The TSP annuity increases a retiree's old age income and explains the increase in slope of the DOD system's line at age 65. The TSP account growth, however, is susceptible to discount rates and is discussed in the next sections.

Another comparison that can be made is to look at the indifference points between the systems. For this thesis, the lifetime earnings indifference point is the age at which the lifetime earnings are equal for two systems. For the O-5, the alternative system provides the highest lifetime earnings until age 77, when it is surpassed by the DOD

system. Thus, for the O-5, age 77 reflects the point at which both systems provide the same lifetime cumulative benefit. Based on lifetime earnings, the alternative system would be preferred until age 77, then the DOD system would be preferred after age 77. Similarly for the E-7, age 72 reflects the indifference point between the alternative and DOD systems. The indifference point between the DOD system and the current system is age 71 for both the E-7 and O-5. The alternative system always provides a higher benefit than the current system, so it is always preferred to the current system.

C. PRESENT VALUE ANALYSIS

To account for the time-value of money, a PV analysis was performed on the previously calculated cash flows. In a PV analysis, current compensation is discounted less than the deferred compensation because current compensation is valued higher than deferred compensation (current compensation can be invested to increase its real value over time). Consequently, the same payment made much farther in the future tends to be valued less than if it was made immediately. This section shows the results from PV calculations performed using the 5.5 percent discount rate described in Chapter IV.

This analysis used the cash flows generated by each system and then discounted them to the 20 YOS retirement point. In this analysis, the system with the highest present value offers the most valuable system at the military retirement point. The alternative system (annuity option) yielded the highest PV for both the E-7 and O-5. The alternative system annuity option provided a 2.8 percent higher PV than the current system for the E-7 and a 10.7 percent higher PV for the O-5. The DOD system offered almost the same PV as the current system, only yielding 0.2 and 0.5 percent increases for the E-7 and O-5, respectively. As an additional comparison, the alternative system's rollover option was also investigated. The rollover option provided a lower PV than the current system for the E-7, but a higher PV for the O-5. Table 22 shows the calculated PVs for each system and option.

Present Value Analysis*				
System	Current	Alternative (Annuity Option)	Alternative (Rollover Option)	DOD
E-7/20	\$425,670	\$437,578	\$409,489	\$426,721
O-5/20	\$797,622	\$882,615	\$827,533	\$801,432

*5.5% discount rate

Table 22. Calculated Present Values for the Three Systems

As shown in Table 22, the alternative system's annuity option offers the highest value to the retiree, in PV terms. This is due to the alternative system's consistent higher income during the second career period. Consequently, the earlier compensation gets discounted less than if it came later in retirement. While the DOD system gives the highest lifetime earnings shown in Table 21, the compensation deferred until later in life (i.e., TSP account) becomes highly affected by the discounting. The deferred compensation is not as valuable to the retiree because it comes much later in life. For an additional comparison, Appendix B shows the PV to the service member at each YOS for each system.

D. COST COMPARISON

To show that the alternative system is viable from a cost perspective, this section compares the alternative system's cost to the current system's cost. The alternative system provides the same benefit as the current system from age 62 until death. Consequently, those costs will be the same and were not included in this analysis. The alternative system's cost savings comes from eliminating the second career annuity and moving a portion of that compensation earlier in members' careers. The DOD Office of the Actuary's *Valuation of the Military Retirement System—September 30, 2011* was used to estimate the costs of both systems.

The enlisted retiree (non-disability) cohort's cost for retirees aged 40 to 61 was calculated to estimate the current system's cost. This model assumed the old age annuity would begin at age 62 and did not include retirees in that age group. Similarly, the officer (non-disability) cohort included officer retirees from age 43 to age 61. The retirement valuation report included data for the average annual pay for retirees at each age. In fiscal

year 2011, the military paid the enlisted cohort \$12,261,466,793 and the officer cohort \$6,131,601,448. The combined total outlays for non-disability retirees in these two cohorts equaled \$18,393,068,241.

As explained in Chapter IV, the alternative system used the military valuation report to determine the number of military members from military entry to 20 YOS. Combining this with the 2014 pay scale, the pay credit and bonus costs for this group of military members were estimated. The officer 15 percent pay credit and associated bonuses equaled to \$2,907,163,779 and the enlisted pay credit and bonuses added to \$5,082,160,306. Thus, the alternative system was estimated to cost \$7,989,324,085, a 56.6 percent cost decrease. Table 23 summarizes the previously described costs.

	Cost		Difference	% Decrease
	Current System	Alternative System		
Officer 2nd Career Component	\$6,131,601,448	\$2,907,163,779	-\$3,224,437,669	-52.6%
Enlisted 2nd Career Component	\$12,261,466,793	\$5,082,160,306	-\$7,179,306,487	-58.6%
Total	\$18,393,068,241	\$7,989,324,085	-\$10,403,744,156	-56.6%

Table 23. Current and Alternative System Annual Outlay Comparison for Second Career Component

The current system estimate includes some members qualifying for the Final Basic Pay retirement system. These members may skew the current system estimate higher than it would be if all members were under the Hi-3 system. Using this model's age assumptions, the youngest enlisted retirees qualifying for the Final Basic Pay system would be age 54 in 2014 and only account for the enlisted cohort's last seven years of the second career retirement period. Similarly, the youngest officer retirees would be age 57 and would make up the officer cohort's last four years. This upward skewing would not account for the approximate \$10 billion annual difference between the two systems. Thus, the alternative system provides a system with a lower annual outlay requirement than the current system.

Additionally, non-vested members' cash balance accounts would revert back to the pension trust. The annual total cash balance account for non-vested members leaving military service was estimated to be approximately \$30 million. This figure does not include any interest earned by the account, only the pay credits contributed to it. While this value may be a small percentage compared to the overall annual outlay, these returns to the trust could accumulate to help offset any future liabilities.

E. SENSITIVITY ANALYSIS

This section offers sensitivity analyses to show the effects of changing specific variables within the model. The sensitivity analyses include changing discount rates, pay credit and bonus sensitivity, and the alternative system's effects on members serving 30 years.

1. Discount Rate Sensitivity

The discount rate applied to the future cash flows does affect a retirement system's PV. This section explores each system's sensitivity to discount rates. The lowest discount rate, two percent, benefited the DOD system because the larger payments made in the old age period are discounted at a lower rate. As the discount rate increased, however, the DOD system's PV dropped at a faster rate than the current and alternative systems' PVs. The current and alternative systems were not affected as much by the changing discount rate because their cash flows are more evenly distributed throughout retirement. Figures 9 and 10 depict the retirement systems' PV as a function of the applied discount rate. Appendix C shows the data tables used to create these figures.

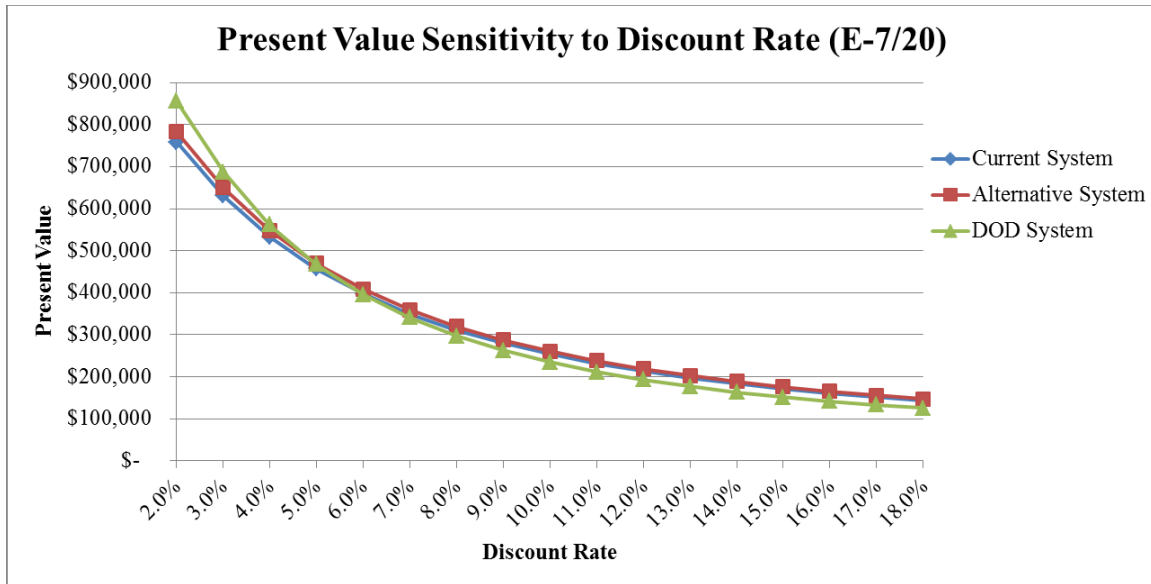


Figure 9. Present Value Sensitivity to Discount Rate for an E-7 Serving 20 Years

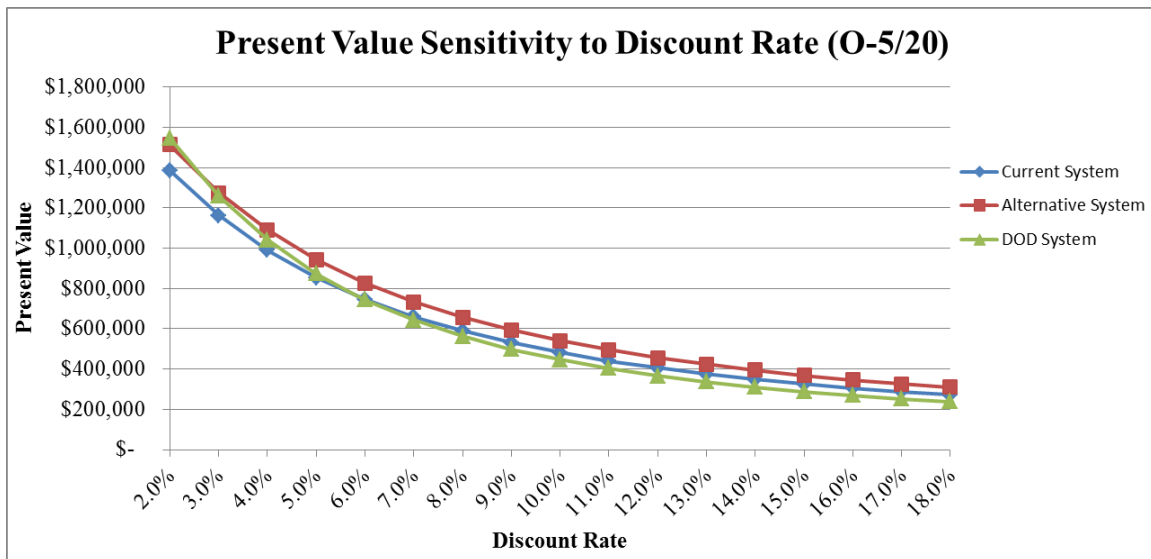


Figure 10. Present Value Sensitivity to Discount Rate for an O-5 Serving 20 Years

Similar to the lifetime earnings indifference point, the alternative and DOD systems have a discount rate at which the PVs are equal. For the E-7, the indifference rate lies at 4.85 percent. At discount rates lower than 4.85 percent, the DOD system gives a higher PV, but at discount rates higher than 4.85 percent, the alternative system produces

the higher PV and would be preferred. Figure 9 shows this graphically as the point when the alternative and DOD systems' lines cross at 4.85 percent. Similarly, the O-5's indifference point lies at 2.6 percent and is graphically shown in Figure 10. Thus, in this model, a discount rate higher than 4.85 percent will give a higher PV for both officers and enlisted service members.

While actual discount rates and personal discount rates vary, the present value analysis suggests that service members would always choose the alternative system to the DOD system. The 4.85 percent indifference rate falls below both the 5.5 percent discount rate used by the DOD Office of the Actuary (DOD, 2013) and the 18 percent personal discount rate suggested by Warner and Pleeter (2001). Thus, the alternative system provides the highest PV in both cases and would be preferred. As Figures 9 and 10 show, the alternative system always yields a higher PV than the current system and would also be preferred over the current system.

2. 30 Years of Service Career

The alternative system was analyzed from the perspective of an E-7 and an O-5 retiring after 20 YOS. This section gives a brief overview for members serving until 30 YOS. For this analysis, the E-7 was assumed to have promoted to E-9 and the O-5 promoted to O-6. The pay credits and bonuses ceased at 20 YOS, but the cash balance account continued to accumulate interest credits at a four percent annual rate. Table 24 shows the resulting annual cash flows generated by the alternative system compared to the current system under this retirement situation.

E-9/30	2nd Career Income	Old Age Income
Current System	\$58,646	\$58,646
Alternative System	\$60,392	\$58,646
O-6/30	2nd Career Income	Old Age Income
Current System	\$95,164	\$95,164
Alternative System	\$146,281	\$95,164

Table 24. Alternative System Compared to the Current System for Members Serving 30 Years

Table 24 confirms that members serving 30 years still earn an increasing retirement benefit with continued service. The retirement benefits increase for two reasons: the cash balance account earning interest and a smaller annuity period. First, the four percent annual return on the cash balance account over the extended 10-year period increases the cash balance account value by 48 percent. Second, the increased cash balance account value is then annuitized for 10 fewer years. Consequently, the annuitized cash balance account generates a higher annual income than the current system's 75 percent of Hi-3 pay.

3. Pay Credit and Longevity Bonus

Pay credit and longevity bonus value changes and their effect on the cash balance account were also investigated. The sensitivity analysis showed that increasing the pay credit by one percent had double the effect of increasing the longevity bonus by one month's basic pay. A one percent increase in the pay credit increased the cash balance account's value at 20 YOS by 2.8 percent. Similarly, increasing an individual longevity bonus increased the cash balance account value by 1.3 percent. Thus, changing the pay credit percentage affected the cumulative cash balance account value more than an increase to the longevity bonus. Decreases to the pay credit and longevity bonus also exhibited the same ratio.

Interestingly, this sensitivity analysis found that changing one longevity bonus and keeping the other two constant yielded the same effect for all combinations. A one-month increase at the sixth year longevity bonus yielded a 1.3 percent increase in the cash balance account's value at 20 YOS. Likewise, increasing the longevity bonus at 10 YOS by one month's pay also increased the cash balance account value by 1.3 percent. The same held true for the 15 YOS bonus as well.

F. FINDINGS

This chapter described the calculated results used to compare the three systems. The results show that the alternative system provides a higher annual income for the retiree during the second career phase and the same annual income during old age when compared to the current system. The DOD system generated the highest cumulative pay

total for a retiree living until age 72 (enlisted) or age 77 (officer). The alternative system, however, offered the highest PV due to the discount rate's effect on the DOD system. Consequently, the alternative system offers an attractive and a potentially preferred system for the service member.

Yet, for the alternative retirement system to be viable, it needs to address the criticisms described in Chapter II: cost, equity, force management, and civilian comparability. Viability cannot be solely based on benefit to the retiree.

1. Cost

The alternative system would save money by removing the current system's second career-defined benefit and using a portion of that money to fund the annual cash balance system. Table 23 showed that the alternative system would cost approximately \$8 billion annually to fund the cash balance component. The 2011 retirement system outlays for retirees in the second career phase approximately totaled \$18.4 billion. Thus, the alternative system can provide a cost-effective alternative that reduces the overall military retirement system cost.

Moving the second career outlays earlier generated two effects. First, the basis used to calculate the benefit, basic pay, is lower during the member's first years in service. In other words, an E-2 makes less in basic pay than an E-7. Consequently, the earned benefit during each YOS is less during a member's early career and progressively gets higher until reaching 20 YOS. These earned benefits, however, are allowed to grow in value to generate an increased benefit at 20 YOS. The alternative does compensate a higher volume of service members because it includes those who will not serve the full 20 years. The increased volume can increase the cost, but Table 23 shows that the alternative system can still save money.

Second, the cash balance account reduces the future liability because it uses known quantities, the active-duty force and alternative system structure, to calculate the annual appropriations required to fund it. Thus, the DOD does not have to actuarially determine the future second career retirement benefits of currently serving members. The

second career benefits will be included in the annual appropriation. The old age annuity will still require actuarial analysis to estimate the future funding requirement.

The pay credit and longevity bonus sensitivity analysis showed that changing the pay credit yields a larger long-term effect on the cash balance account value. Additionally, Tables 15 and 16 show that the longevity bonuses require higher cumulative outlays than the pay credits. These two trends indicate that altering the pay credit offers the most cost-effective change, should it be required. At the extreme, raising the pay credit and eliminating the bonuses would require the lowest annual outlays, but as will be discussed in a later section, this would not offer any force management tools to retain the desired force. Thus, the bonuses were included in the alternative system.

2. Equity

As mentioned in Chapter II, O'Hanlon (2011) described the current system as being too generous to those serving 20 years but not generous enough to those not serving the full 20 years. The alternative system answers this equity criticism by providing a retirement benefit for members who serve at least six years. The alternative system's design provides a larger retirement benefit similar benefit to what is found in the private sector. Chapter III found that the most prevalent private sector systems only match six percent of annual earnings and require employee contributions to earn the employer matching contributions. The alternative system contributes 15 percent of income for all service members and does not require service member matching contributions. Thus, it provides a larger benefit than private sector retirement plans.

While the 20 YOS retirees still retain a slightly better benefit with the alternative system, members serving less than that also earn a benefit. Chapter III described the Defense Business Board's (2011) plan to create a defined contribution system. This system proposed making higher contributions for members in hardship situations such as combat or deployment. The alternative system has a contribution that compensates for these situations and other intangible situations such as the inability to build equity in a home or a spouse's hindered career. As Tables 15 and 16 show, service members, especially those serving more than 10 years, can leave military service with a benefit that

reflects their sacrifices. To answer O'Hanlon's critique, the alternative system now gives a generous benefit to those serving at least six years.

3. Force Management

The cash balance account offers both a recruitment and retention tool for force management. As described in the previous section, the retirement benefit serves as a powerful recruitment tool because it offers a better benefit than normally found in the private sector. This benefit makes military service competitive with private sector compensation.

With an earlier vesting point and the longevity bonuses, service members are offered additional benefits to remain in military service. In the current system, a member with 6 YOS still requires 14 years to earn a benefit. This timespan creates a long-term reward for continued service and is subject to personal discounting by the individual service member. In the alternative system, the first, and smallest, longevity bonus gives a small reward to service members serving a second tour. The 10 YOS and 15 YOS bonuses, however, give much higher rewards for continued service, as can be seen in Tables 15 and 16. These incremental bonuses give near-term compensation rewards to service members that incentivize retention and are subject to less individual personal discounting. In essence, the bonuses act as a bread trail to lead service members to a full career.

The DOD system proposed using a continuation bonus that varies by skill and position to retain the "right people." The current military compensation system already gives certain bonuses, like selective reenlistment bonuses (SRB) and the Navy's Aviation Career Continuation Pay (ACCP) bonus, to retain the "right people." The DOD's continuation bonus acts more as a compensation bonus than as part of a retirement system. The alternative system's longevity bonuses are actual retirement bonuses that can be added to the existing bonus compensation system. This provides an alternate system to retain the "right people" with the "right skills" because it provides a broad incentive to remain on active duty and then rewards specific positions with specific bonuses.

Lastly, the current retirement system reduces a commander's reluctance to remove subpar performers who may be late in their careers. Chapter II noted that commanders were hesitant to separate subpar members with 15 YOS because the members would lose their retirement benefits. From Tables 15 and 16, the alternative system would give \$164,653 to a separated enlisted member with 15 YOS and an officer would receive \$322,696. These figures assume the subpar member did not receive the 15 YOS longevity bonus. As shown, members separated for poor performance during the latter portion of their careers would still receive a benefit. Thus, the alternative system may decrease a commander's reluctance to remove these members.

4. Civilian Comparability

Being derived from private sector retirement plans, the alternative system achieves civilian comparability. The cash balance component provides a portable retirement benefit that can easily be moved from the military to a private sector employer. The vested cash balance account's lump-sum value offers an easily transferrable benefit to the service member. The cash balance value can be rolled into a future employer's retirement plan or it can be placed into an individual retirement account. This portability offers an attractive benefit to potential recruits who may not want to serve 20 years, but would like to serve a shorter time.

Cash balance accounts also offer an easily recognized value as the contributions and account value grows. Much like a private sector employee's monthly pay stub, the member's leave and earnings statement (LES) could report the monthly contribution made into the cash balance account and also the account's accumulated value. Alternatively, the cash balance trust could set up an electronic database that members could view online, like the current Thrift Savings Plan (TSP). Both of these methods allow members to view their retirement compensation similar to private sector employees. Additionally, these methods would allow members to recognize their deferred benefits as if they were current compensation, unlike the current system.

The cash balance component utilizes another benefit found in the private sector because it does not cap the contribution that can be made into it. The Internal Revenue

Service caps the tax-deferred contributions that can be made into a defined contribution system, such as the TSP, at \$17,500. Company contributions into a defined benefit plan are capped at \$210,000, 1,100 percent higher than the \$17,500 limit. Thus, the longevity bonuses would not be subject to these contribution limits and could remain in a tax-deferred status. (Internal Revenue Service, 2013)

One alternative system aspect that does not fully satisfy civilian comparability lies with a member's choice of investments. The cash balance retirement trust managers determine the investments made on behalf of the service members. Chapter III, however, found that many employees do not fully understand financial investing and management. Thus, the cash balance component provides a paternalistic control on the military retirement system that guarantees a specific return to all service members, some of whom may not fully understand these retirement choices. The alternative system does provide a limited choice for 20 YOS retirees through the annuity or rollover options.

G. CHAPTER SUMMARY

This chapter established that the alternative system offers a viable modification to modernize the retirement system. It showed that the alternative system provides a larger benefit than the current system and also a higher PV than the DOD system. The alternative system also gives members with 30 YOS careers an increasing benefit that surpasses the current system's benefit. Finally, the chapter showed that the alternative system answers the cost, equity, force management, and civilian comparability criticisms that plague the current military retirement system.

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VI. CONCLUSIONS AND RECOMMENDATIONS

The military retirement system's rising cost presents an obvious target for cost reduction in 2014's fiscally constrained environment. Yet, a number of reform commissions and proposals dating to 1948 have been unable to create lasting change to modernize the system. An alternative to modernize the retirement system while reducing the cost was proposed in this thesis. The proposed alternative system incorporates a cash balance component to modernize the military retirement system.

The alternative system was designed to be faithful to service members by providing the same retirement benefit as the current system. The cash balance system achieves this goal by providing 1.4 percent higher lifetime earnings for an E-7 retiring after 20 YOS and giving an O-5 retiring at 20 YOS 6.4 percent higher lifetime earnings. Additionally, the alternative cash balance system yielded a higher present value than both the current system and a Department of Defense (DOD)-proposed system for any discount rate above 4.85 percent. Thus, military retirees are likely to prefer the proposed cash balance alternative over either the current system or the DOD system.

The alternative system also answered the current system's four primary criticisms: cost, equity, force management, and civilian comparability. The cash balance contributions cost less than the current outlays for the second career component. The early vesting gives members serving at least six years some retirement benefit. The 15 percent pay credit and longevity bonuses offer recruitment and retention incentives. Finally, the vested cash balance account provides a portable retirement benefit that can be rolled into another retirement plan or individual retirement account.

The cash balance component allows the DOD to utilize a modernized retirement system that provides a conservative approach to retirement. Being a defined benefit system, service members are guaranteed specific retirement benefits, regardless of stock and bond market volatility. By making the contributions to a managed retirement trust, the DOD compensates for the limited financial knowledge of some potential retirees. While this may not be desirable to some potential retirees, the managed trust protects the

members who may not have investment knowledge. Ultimately, the 20 YOS retirees will still receive the same benefit as they would under the current system.

A. MAIN FINDINGS

This thesis showed that incorporating a cash balance component into a military retirement system offers a viable alternative to reform and modernize the current system. Specifically, the findings in this thesis are:

- The annuitized cash balance generated a higher retirement income during the second career phase when using a 15 percent pay credit, 4 percent interest credit, and longevity bonuses at 6, 10, and 15 YOS.
- The annual outlays required by the cash balance component would cost less than the current system's outlays during the second career retirement phase.
- The alternative system yielded a higher present value than both the current system and the DOD system for any discount rate above 4.85 percent.
- The DOD system is highly sensitive to the applied discount rate due to the TSP account's deferral until old age.
- The alternative system provides a higher second career retirement income for 30 YOS retirees.
- Changing the pay credit yields a more cost-effective alteration than changing the longevity bonus.
- The non-matching 15 percent pay credit offers a higher retirement benefit than most private sector plans that match up to six percent.
- The cash balance component allows an 1,100 percent higher tax-deferred contribution than a defined contribution plan.

B. RECOMMENDATIONS FOR FUTURE STUDY

The viability of incorporating a cash balance component into retirement reform and modernization was investigated in this thesis. As such, it analyzed the effect on a retiree's income and total system cost, assuming 100 percent of retirees fall under the system. The thesis suggested positive effects to recruitment and retention. To further understand a cash balance component's effect on the military retirement system, continued research should address the following areas:

- Alternative system's effect on recruitment
- Alternative system's effect on retention
- Optimal longevity bonus schedule and amounts from a force management perspective
- Potential unfunded liability due to the interest credit during down stock and bond markets
- Conversion cost to switch to the alternative system
- Cash balance retirement trust's annual management cost
- Service members' preference between the cash balance annuity and rollover options

APPENDIX A. PLAN TYPE COMPARISONS

In Tables 25 to 28, Wells Fargo (2012, p. 5–8) compared traditional defined benefit plans to both cash balance plans and defined contribution plans.

Plan comparison Traditional Defined Benefit versus Cash Balance versus Defined Contribution				
Feature	Traditional Defined Benefit plans (DB)	Cash Balance plans (CB)	Defined Contribution plans (DC)	Advantages/disadvantages
Benefits				
Amount of benefit	Fixed (i.e., “defined”); determined from plan benefit formula; typically a function of years of service and compensation	Somewhat fixed; determined from plan accumulation formula; typically a function of compensation and investment credits; compensation credits and investment credits correlate to contributions and investment earnings in DC plans	Ultimate benefit depends on accumulation of contributions and investment earnings	<ul style="list-style-type: none"> • DB can be designed to provide benefits at targeted income replacement ratios • Lower paid employees do not have disposable income to save for their own benefit in DC • Significant benefits can accumulate in the early stages of a participant’s career in DC
Guaranteed benefits by employer	Employer obligated to provide defined benefit	Employer obligated to provide accumulated balance of compensation and investment credits	Employer NOT obligated to provide defined benefit	<ul style="list-style-type: none"> • No reduction in benefits under DB if participant retires when stock market is low
Responsibility for benefits	Typically employer bears full responsibility for providing benefits	Typically employer bears full responsibility for providing benefits	Employee bears responsibility for making contributions and making investment decisions to fund benefits; employer may also contribute	<ul style="list-style-type: none"> • Lower paid employees may not be able to accumulate a meaningful retirement benefit in DC
Form of payment	Monthly benefits; can also offer single sum benefits	Must offer monthly benefits, but most plans also offer single sum benefits	Single sum benefits typically; can also offer monthly benefits	<ul style="list-style-type: none"> • DB provide life annuity payments more efficiently than CB or DC • Life annuities eliminate risk of participants outliving account balances • Many participants who receive single sum distributions spend them rather than saving them for retirement
Time for payments to commence	Typically at retirement age	Typically upon termination of employment	Typically upon termination of employment	<ul style="list-style-type: none"> • Participant may have to wait until normal retirement age to receive benefit from DB
Portability of benefits	None, unless single sum payment	Highly portable due to single sum payment option	Highly portable due to single sum payment option	<ul style="list-style-type: none"> • Single sum payment option allows employer to avoid keeping track of terminated employees until benefits are payable • Participants can roll single sum payments into plan of new employer or into IRA

Table 25. Traditional and Cash Balance Defined Benefit Plans Compared to a Defined Contribution Plan
(from Wells Fargo, 2012, p. 5–8)

Plan Comparison Traditional Defined Benefit versus Cash Balance versus Defined Contribution				
Feature	Traditional Defined Benefit plans (DB)	Cash Balance plans (CB)	Defined Contribution plans (DC)	Advantages/disadvantages
Contributions				
Amount of contribution	Varies based on plan liabilities, actuarial assumptions and plan assets	Varies based on plan liabilities, actuarial assumptions and plan assets	Defined by plan; typically based on percentage of payroll	<ul style="list-style-type: none"> Excess investment earnings in DB and CB reduce cost to employer Greatest volatility in DB funding requirement, CB is more stable, DC is most stable Employee typically does not contribute to DB or CB
Flexibility in contributions	Can be flexible	Can be flexible	Little or no flexibility unless employer contributions are discretionary	Flexibility in level of contribution above minimum required funding in DB and CB
Minimum funding requirements apply	Yes	Yes	No, except for money purchase plans	Minimum funding standards provide added security to employee
Plan termination liability	Employer must provide accrued benefits (PBGC provides guarantee in event of bankruptcy)	Employer must provide accrued benefits (PBGC provides guarantee in event of bankruptcy)	None	
Fees and expenses				
Administrative expenses	Have actuarial cost not required in DC, but recordkeeping costs typically less than DC	Typically more costly than traditional DB plans	Least costly in terms of administrative expenses; recordkeeping and employee education costs may be higher	<ul style="list-style-type: none"> DB typically less costly per dollar of retirement benefit provided (more efficient use of contributions) Can be passed on to participants in DC through direct or indirect fees
Expense recognized on financial statements	Yes	Yes	Yes, but equal to contribution made	<ul style="list-style-type: none"> DB and CB result in separate GAAP accounting expense and minimum funding requirements for legal and tax purposes. Differences in tax versus GAAP accounting create deferred tax liability or asset on company books. DB and CB expense can be volatile just as minimum funding requirements are volatile. Both move in the same direction, although there can often be substantial year-by-year differences.

Table 26. Traditional and Cash Balance Defined Benefit Plans Compared to a Defined Contribution Plan
(from Wells Fargo, 2012, p. 5–8)

Plan Comparison Traditional Defined Benefit versus Cash Balance versus Defined Contribution				
Feature	Traditional Defined Benefit plans (DB)	Cash Balance plans (CB)	Defined Contribution plans (DC)	Advantages/disadvantages
Fees and expenses (continued)				
PBGC coverage	Required for most plans	Required for most plans	Not required	• DB and CB must pay premiums to the PBGC
Miscellaneous				
Employee understanding	Low, but can be improved with regular employee communications	Better than DB, but probably less than DC	High	• CB and DC easier for employees to understand and therefore appreciate
Employees favored	Higher paid, longer service employees	Younger, shorter service employees	Younger, shorter service employees	<ul style="list-style-type: none"> • DB allow employer to reward longer service and higher paid employees • DB useful in the recruitment of older executives; executives hired at mid-career or later cannot accrue meaningful benefit in DC • CB and DC useful in recruitment of younger employees • CB and DC advantageous for employees who change jobs frequently • DB more advantageous for "fast-track" employees whose earnings increase more rapidly than inflation
Employer attitude	Paternalistic	Paternalistic, though not as much as traditional DB plans	Employee should bear some (or primary) responsibility for retirement benefits	
Investment risk	Employer bears risk	Employer bears risk	Employee bears risk	<ul style="list-style-type: none"> • DB and CB may experience higher rates of return due to employer's ability to and understanding of investing for long-term • DB and CB do not require participants to become investment experts, participants are often too conservative with their own DC investments • Employer still has fiduciary responsibility in DC with participant directed investments (e.g. soliciting or monitoring appropriate investment options)

Table 27. Traditional and Cash Balance Defined Benefit Plans Compared to a Defined Contribution Plan
(from Wells Fargo, 2012, p. 5–8)

Plan Comparison Traditional Defined Benefit versus Cash Balance versus Defined Contribution				
Feature	Traditional Defined Benefit plans (DB)	Cash Balance plans (CB)	Defined Contribution plans (DC)	Advantages/disadvantages
Miscellaneous (continued)				
Separate accounts for each employee	No	Recordkeeping accounts exist for each participant, but these accounts are not reconciled directly to assets as in DC plans.	Yes	• Participants understand separate accounts better since similar to bank balance
Ability to reward prior service	Easier to recognize	Easier to recognize	Much harder to recognize and not as effective in recognition	• DB and CB advantageous if employer wishes to recognize past service • Participant's past service at plan inception generally not recognized in DC
Cost-of-living recognition	COLA increases can be provided to protect against inflation	COLA increases can be provided to protect against inflation, but ineffective if high selection of single sum payments	Cannot provide COLA increases	• DB most useful for providing inflation protection (though costly to provide) • Participant more likely to have inflation-protected benefits in DB
Early retirement incentive	Employer can easily provide subsidies to encourage early retirement generally or for select "window" period	Can employ traditional DB techniques	Difficult to provide	• DB and CB useful to employer who wishes to encourage early retirement

Table 28. Traditional and Cash Balance Defined Benefit Plans Compared to a Defined Contribution Plan
(from Wells Fargo, 2012, p. 5–8)

APPENDIX B. PRESENT VALUE AT EACH YEAR OF SERVICE

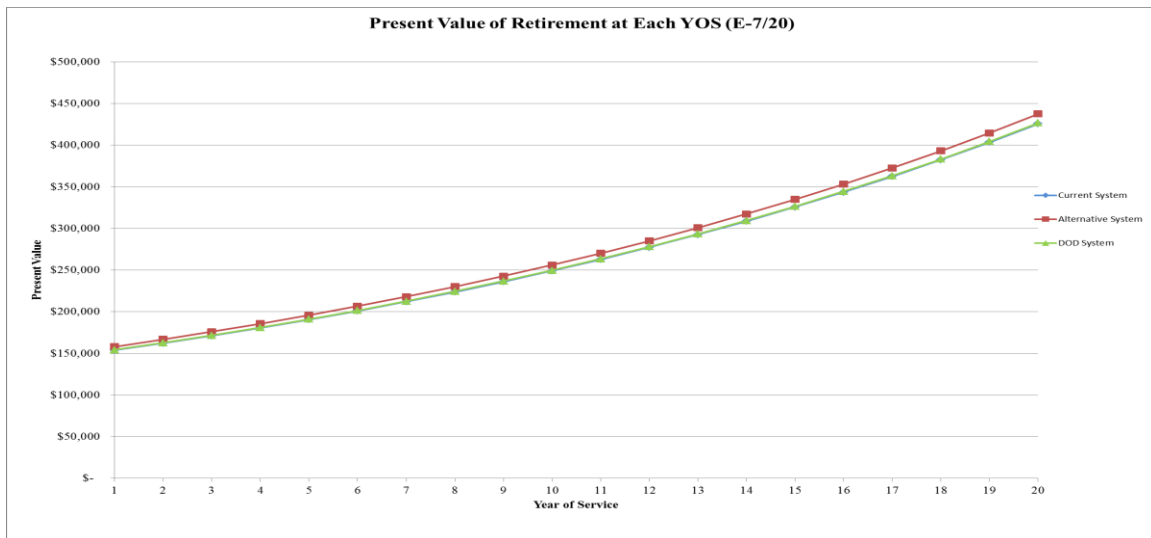


Figure 11. Present Value at Each Year of Service for an E-7 Retiring with 20 Years of Service: Current, Alternative Annuity, and DOD Systems

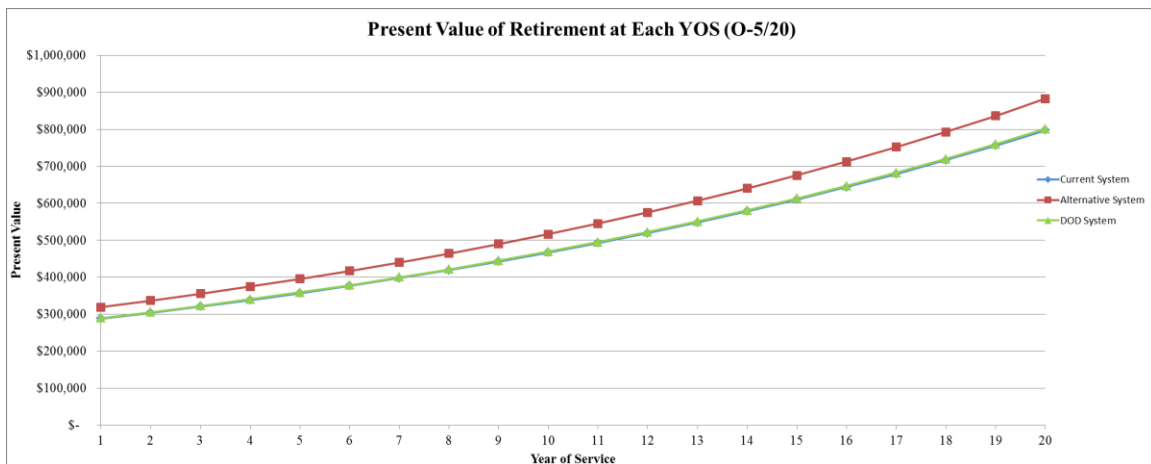


Figure 12. Present Value at Each Year of Service for an O-5 Retiring with 20 Years of Service: Current, Alternative Annuity, and DOD Systems

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APPENDIX C. DISCOUNT RATE SENSITIVITY TABLES

Discount Rate	System Present Value		
	Current	Alternative	DOD
2.0%	\$ 758,599	\$ 782,579	\$ 856,263
3.0%	\$ 630,714	\$ 649,625	\$ 687,036
4.0%	\$ 532,998	\$ 548,391	\$ 561,787
5.0%	\$ 457,217	\$ 470,107	\$ 467,733
6.0%	\$ 397,583	\$ 408,644	\$ 396,061
7.0%	\$ 349,986	\$ 359,671	\$ 340,634
8.0%	\$ 311,474	\$ 320,097	\$ 297,138
9.0%	\$ 279,906	\$ 287,685	\$ 262,509
10.0%	\$ 253,709	\$ 260,803	\$ 234,551
11.0%	\$ 231,718	\$ 238,242	\$ 211,673
12.0%	\$ 213,058	\$ 219,101	\$ 192,710
13.0%	\$ 197,067	\$ 202,696	\$ 176,799
14.0%	\$ 183,236	\$ 188,505	\$ 163,297
15.0%	\$ 171,174	\$ 176,125	\$ 151,718
16.0%	\$ 160,572	\$ 165,241	\$ 141,691
17.0%	\$ 151,187	\$ 155,604	\$ 132,929
18.0%	\$ 142,827	\$ 147,017	\$ 125,211

Table 29. Present Value Sensitivity to Discount Rate for an E-7
Serving 20 Years

Discount Rate	System Present Value		
	Current	Alternative	DOD
2.0%	\$ 1,384,781	\$ 1,513,886	\$ 1,547,012
3.0%	\$ 1,162,438	\$ 1,275,024	\$ 1,258,203
4.0%	\$ 990,008	\$ 1,089,707	\$ 1,040,256
5.0%	\$ 854,525	\$ 943,925	\$ 873,684
6.0%	\$ 746,691	\$ 827,680	\$ 744,736
7.0%	\$ 659,778	\$ 733,762	\$ 643,629
8.0%	\$ 588,871	\$ 656,923	\$ 563,337
9.0%	\$ 530,344	\$ 593,301	\$ 498,773
10.0%	\$ 481,496	\$ 540,024	\$ 446,217
11.0%	\$ 440,298	\$ 494,937	\$ 402,926
12.0%	\$ 405,208	\$ 456,404	\$ 366,861
13.0%	\$ 375,046	\$ 423,170	\$ 336,489
14.0%	\$ 348,896	\$ 394,265	\$ 310,648
15.0%	\$ 326,045	\$ 368,930	\$ 288,450
16.0%	\$ 305,931	\$ 346,565	\$ 269,209
17.0%	\$ 288,106	\$ 326,694	\$ 252,393
18.0%	\$ 272,213	\$ 308,932	\$ 237,582

Table 30. Present Value Sensitivity to Discount Rate for an O-5
Serving 20 Years

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